

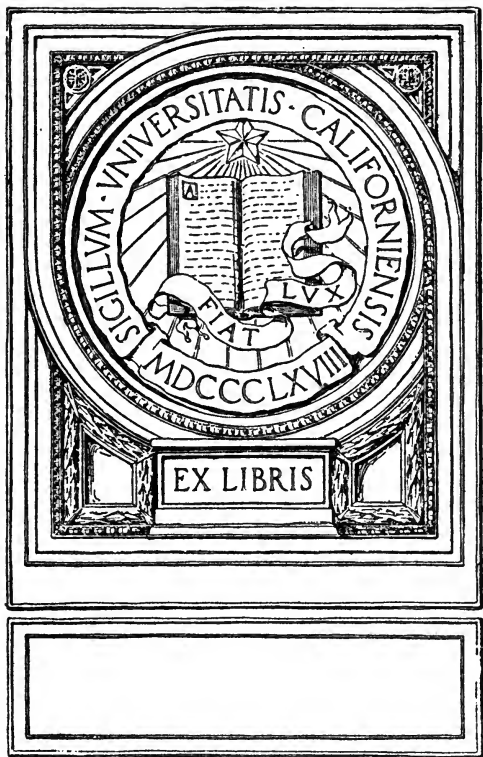
NOTES OF LESSONS
ON THE
HERBARTIAN METHOD

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ON
THE HERBARTIAN METHOD

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NOTES OF LESSONS
ON THE
HERBARTIAN METHOD

(BASED ON HERBART'S PLAN)

BY
M. FENNELL
AND
MEMBERS OF A TEACHING STAFF

WITH A PREFACE BY

M. FENNELL
LECTURER ON EDUCATION

NEW IMPRESSION

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PREFACE.

THE main idea in the Herbartian system of psychology is that the mind is built up of its own contents. Herbart, following Locke, not only denies the existence of "innate ideas," but puts contemptuously aside the doctrine of inborn faculties or capacities for acquiring knowledge. According to him, and others of his school, the mind possesses but one single original power: that of entering into relation with externals. Given this power, the mind at certain points of contact receives into itself "presentations" (sense percepts), each reception causing growth or, as he would put it, "widening the circle of thought". But these mental contents are not often merely passive, they most frequently become "presentative activities," their force and suggestiveness being increased every time one returns to the surface of consciousness. By a process of selection and assimilation new "presentations" are joined to old, while the earliest and most simple by their interaction produce others of varying complexity.

When a child comes for the first time to a teacher a certain number of these "presentations," with more or less cohesion among themselves, are already to be counted as its mental furniture and equipment, having entered partly by way of experience and partly by way

of intercourse, which is pretty much the same as saying that the mind has found out something *of* or *by itself*, and has learnt other things from previous instructors. This being so, Herbart's idea of the teacher's work is that out of the "presentations" existent he is to create "*Knowledge*," and by intercourse he is to arouse "*Sympathy*". As there are no "faculties" save and except the one of receiving impressions from without, the Herbartian does not set out to *train* and *exercise* and so *develop* the mind, but begins to provide the very food and substance of the mind ; to build up a mind, in fact, by carefully building "apperception masses" up. The word "apperception" was used before Herbart used it, but with slightly different meaning: with him it signifies the taking into the mind new "presentations" by means of groups of similar ideas which already form part of the mental content. It is almost equivalent to assimilation, for by it ideas already in existence receive not alone an addition but a new determination.

It is not the aim of the writer to inquire at length into this theory of "Apperception" and "Apperception Masses," nor to trace the family resemblance between the action of groups of "similar masses" and our old friend the Association theory, since without at all subscribing to the principles put forward by Herbart we may clearly assent to the conclusion he arrives at, *viz.*, the absolute necessity for teaching *thoroughly* by means of assimilation; of using in the process of instruction the knowledge, and even the smallest particle of knowledge, already possessed by the pupil; and finally, in the act of instruction, to stimulate, concentrate, associate, reflect on, and cause the pupils consciously to reproduce the subject-matter of the lesson. It is here that Herbart has done good and lasting educational work. He has emphasised the old axiom "Teach from

the known to the unknown"; but he has done more, and shown us *how* to do it. True, the Herbartian "Steps," as they have been called, are not wholly new to thoughtful teachers, but they are lucid and concise, and must infallibly prove extremely helpful to young teachers.

As a preliminary, Herbart lays much stress on "Interest" (though we demur at his tendency to *identify* it with Attention): "To be wearisome," he says, "is the cardinal sin of instruction". He also evidently appreciates the position of the inexperienced teacher when about to prepare his lesson; to select and classify and put into order, not alone the matter to be presented, but the mode of presenting it—the "Procedure" as it is called in the "Notes" which follow. "The teacher's greatest difficulty," he says, "is to find real *particulars*; to analyse his own thoughts into their elements." It is to lighten this difficulty that the present volume of lessons is issued, drawn up in conformity with Herbart's plan, but, as the reader will see, not following his psychology in the "Aim" of the lesson.

The "Steps" briefly are: Preparation, Presentation, Assimilation, Application or Association, and Recapitulation.

Reference has already been made to the fact that even the youngest pupil comes to a lesson with pre-existing knowledge. Herbart intimates the first step by saying that "This circle [of thought] is to be widened, or *its contents more thoroughly examined*," so that the *Preparation* will sometimes consist of a question or two which acts like a searchlight on the pupil's mind. The questions oftenest refer to the last lessons in the particular branch, *e.g.*, in Grammar, Arithmetic, Euclid, etc. The questions resuscitate ideas, rules, principles, examples, etc., in order to concentrate or determine

the direction of concentration before the actual teaching begins.

When the right ideas are uppermost in the consciousness, the new cognitions are placed clearly before the class. This is the second step, or *Presentation*; and under this heading the teacher groups as much new matter as can be clearly apprehended in the allotted time. I do not say *assimilated*, because it most frequently happens that the work of assimilation (using the word in its general sense) goes on slowly and gradually, perfect illumination coming irregularly.

Nothing is more foreign to the Herbartian method than “cram,” so it would be a fundamental error to overload this second stage.

Following the “presentation,” or going hand in hand with it, is the work of connecting the new and old, of illustrating, questioning on, and so helping the pupil towards *Assimilation*. The place in time in the lesson of *Association* varies with different branches: *e.g.*, in an object-lesson on an animal the description of its various parts and organs (presentation) is associated with its *uses*, the latter presentation being the complement of the former. In a natural science lesson the *experiments* are the associating link, the *deductions* from them form the new presentations. Lastly, there is the important *Recapitulation* which summarises and re-pictures for the pupils the important parts of the lesson; which searches their minds by concise and pointed questions, forces them finally to concentrate their attention on the subject-matter as a “unity,” and fans their flagging interest.

Such in brief is the Herbartian method of instruction. It is applied in practical form to various branches in the “Notes of Lessons” which follow. Here and there a sufficient number of lessons on one

topic have been written to form a "series," but this has not been attempted in general. If the "Lessons" give to English Teachers a working knowledge of all that is best in the Herbartian method, they will fulfil their end.

M. FENNELL.

WIMBLEDON, *December*, 1901.



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LESSON ON EARLY ENGLISH PROSE AND POETRY.

Class—Age, 11 to 13 years. *Time*—Half an hour. *Aim*—To exercise imagination of class and lead them to know the origin of English Prose and Poetry.

MATTER.

I. Preparation.

1. Meaning of Literature. { A collective term for all writings not connected with any special art or science.

Two kinds, *Prose* and *Poetry*.

II. Presentation.

1. *How Literature has been preserved.* { (a) Stored up by memory, repetition and tradition. Bards, Minstrels. Ex.: Homer for 500 years.
(b) By signs and letters on leaves, parchment, flattened reeds and inner bark of trees.
(c) Writing on parchment { Monks, and paper. { Scriptorium.
(d) Printing after Caxton, 1474.
2. *First English Poetry.* { *Cædmon*. Whitby and St. Hilda, 670.
Paraphrased Old and New Testament.
Form. Head rhyme or alliteration.
3. *First English Prose.* { (a) Father of English prose, Ven. Bede, seventh century.
(b) A monk at Jarrow-on-Tyne.
(c) Chief works { (i.) Ecclesiastical history.
(ii.) Gospel of St. John translated.
(d) Story of death as told by his disciple Cuthbert.

- (a) "The newspaper, the Annals, the History of the Nation."
4. *Saxon Chronicle*. { (b) Lasted till 1154.
(c) Various writers. Monks. King Alfred.

III. Association.

Compare literature of to-day as regards—

- (a) Methods of preserving.
- (b) Subjects chosen.
- (c) Character of writers.

IV. Application.

- Use of Literature*. { (a) History ; Ex. : *Saxon Chronicle*.
(b) Change of language.
(c) Bad or good influence.
(d) As regards education.

V. Recapitulation.

Class to write out brief answers to following questions :—

- (a) Define the term " literature ".
- (b) What was the *Saxon Chronicle* ?
- (c) Write a short essay showing how a modern school would differ from one in early English times.

PROCEDURE.

I. 1. Question pupils as to the different subjects about which books are written, and show that the manner in which a thing is expressed has more to do with literature than the subject-matter. Give examples of lesson books, etc., which would not be considered literature. Literature is divided into prose and poetry.

II. 1 and 2. Literature preserves the thoughts of great people, and when they had no books how could these thoughts be remembered ? Explain bard, minstrel, and refer to Homer carried down by repetition for five hundred years. What were the very earliest kind of books ? Tell the class how leaves, bark, and flattened reeds were used for books and to preserve writing. Who wrote the books and spent their lives copying, etc. ? When was this state of things changed ? how ? why ? What difference would this make to the value of

books and the spread of literature? Now the first English poetry was written, composed by Cædmon. (Tell story of St. Hilda and Cædmon.) Subject was parts of Old and New Testament, and kind of rhyme very strange. All words of same initial letter were used. Called "Alliteration" or head-rhyme. Quote "An Austrian army awfully arrayed," etc. Show Whitby on map, and then relate account of first English prose writer, Venerable Bede, in seventh century, a monk at Jarrow-on-Tyne. (Show on map.) He wrote a history of what he would naturally study, as he was a priest. He also translated the Gospel of St. John, etc. (Tell story of his death.)

3. As there were no books or papers such as we have now to tell the news, how is it we know so much about those times? Bards, minstrels, etc., and the *Saxon Chronicle*, which was written till 1154. (Who was reigning then?) The chief writers were again the monks.

III. Now we see how difficult it was to keep account of events in those far-off times. What methods have we to-day of keeping a history of news, events? What subjects did our first prose and poetry writers take? and what is chosen now? What sort of people wrote in early times, who made the books, etc., and who does it now? From this we see that the Church was the first to help on literature.

IV. What uses can be made of good literature?

EXPLANATION AND PARAPHRASE OF A POETICAL EXTRACT.

(Introduction to *Lay of Last Minstrel*.)

Class—Average age, 13. *Time*—Half an hour. *Aim*—To lead class to understand the full meaning and appreciate the beauty of the passage, and thus be able to reproduce it in their own words.

MATTER.

I. Preparation.

- | | |
|-------------------|---|
| 1. <i>Source.</i> | { Sir Walter Scott.
Introduction to <i>Lay of Last Minstrel</i> .
Other works of same author. |
|-------------------|---|

2. *General Sense of the Passage.* { A patriotic burst of enthusiasm.
 Whatever else a man may have he will be deemed unworthy, and will soon be forgotten if he have not this love of country.

II. Presentation.

- Difficulties to be Explained.* {
1. *Inversions for Emphasis.* { (a) "Breathes there a man."
 (b) "As home his footsteps he hath turned."
 (c) "For him no minstrel raptures," etc.
 (d) "High tho' his titles," etc.
2. *Omissions.* { (a) "High tho' his titles (be)."
 (b) (As) "Boundless his wealth as wish," etc.
 (c) "Living (he) shall forfeit," etc.
 (a) "hath" : poetical.
 (b) "strand" = shore ; here = land.
 (c) "if there be," subj. mood, less often used now.
 (d) "tho' high his titles," subj. mood, less often used now.
3. *Meaning of Words and Grammar.* { (e) "minstrel raptures," noun, used as adjective.
 (f) "despite" = notwithstanding.
 (g) "pelf" = riches.
 (h) "vile dust" = the earth.
 (i) "sprung," past partic. for past tense.
 (j) "concentred," i.e., concentrated.
4. *Figurative Expressions.* { (a) "soul so dead," i.e., with so little feeling.
 (b) "Whose heart burned"—*metaphor*.
 (c) "footsteps turned" } *Synecdoche* { part for whole.
 "foreign strand" }
 (d) "power and pelf"
 "forfeit fair" } Alliteration.
 "doubly dying" }

IV. Application.

Paraphrase of Passage.

“Is there any one so devoid of love for his country as to feel no thrill of emotion when he returns home from travel in other lands? If so, note him; for the poet’s song is not for him, however great may be his rank and riches: notwithstanding all these, the unhappy man, wrapped up in himself, will lose his reputation during life, will die without friends, or honour, forgotten by all.”

PROCEDURE.

III. Assimilation.

I. Refer briefly to the writer of the passage, who he was, where he lived, his first poem. Ask what else he wrote and how he is best known now. Tell class his poetry is noted for his many inversions of the natural order of words; let them look out for such in reading the passage. (Now read passage while class follow with their books.) Ask them for the general sense of passage, and point out what a beautiful patriotic outburst it is. Ask to what country Scott referred naturally. Have we any similar one of Shakespeare referring to England?

II. Next let class read it simultaneously, then ask what unusual order we find in the opening words. Why thus placed? Find out the examples of inversions for emphasis. Where is the emphatic word placed? What is meant by “heart . . . burned”? Is it literally true? What kind of language is it then? How can we express it simply? What figure of speech is it? Ask for other examples of metaphors from class. Call attention to other figures in the first six lines and draw from class their force and meaning; then let one of the class express the first six lines in his own words.

Take the next four lines in a similar way. Ask the mood of “If such,” etc., and if it is common now. Is there any other example of subjunctive mood in these lines? When

is the subjunctive used? What is understood before "boundless"? What would be the natural order? Why changed? Paraphrase these lines. Read the last six, ask meaning of "pelf," and if often used, where chiefly found? Note "concentred". What is unusual about this word? What form has it generally? Compare "centred" and "concentrated". What do both mean? How expressed otherwise? Ask what the class notices about the first letters of some words in lines 13 and 14. Tell them about alliterative poetry and give another example. What is meant by "doubly dying," "vile dust"?—both poetical. What part of the verb is "sprung"? Is it correctly used here? How do we express "unwept" and "unsung" in simpler form?

IV. Let one or two pupils now paraphrase the last six lines, then several go through the whole without interruptions as to allusions or grammar, seeking only the best way to express the thoughts of Scott truly but in natural prose.

Let class write out the paraphrase for home-work.

"Breathes there the man, with soul so dead,
 Who never to himself hath said,
 'This is my own—my Native Land!'
 Whose heart hath ne'er within him burned
 As home his footsteps he hath turned
 From wand'ring on a foreign strand?
 If such there breathe, go—mark him well:
 For him no minstrel raptures swell;
 High though his titles, proud his name,
 Boundless his wealth as wish can claim—
 Despite those titles, power and pelf,
 The wretch, concentred all in self,
 Living, shall forfeit fair renown;
 And, doubly dying, shall go down
 To the vile dust from whence he sprung,
 Unwept, unhonoured and unsung!"

NOTES OF A LESSON ON ELIZABETHAN LITERATURE.

Class—Age, 15 to 17 years. *Time*—Three-quarters of an hour. *Aim*—To exercise imagination and judgment while imparting a general idea of the period.

MATTER.

I. Preparation.

- | | | |
|--|---|---|
| I. <i>Causes</i> leading to this new and great period, | { | (a) Effect of Renaissance began to be felt in England only in the sixteenth century.
(b) Peace and prosperity at home.
(c) Impulse received from discoveries in the New and Old World and in science. |
|--|---|---|

II. Presentation.

- | | | |
|------------------|---|---|
| (a) <i>Rise.</i> | { | (a) Pageants, Mysteries and Moralities of olden Times.
(b) Translations of classical dramas.
(c) Original dramas. |
|------------------|---|---|

I. THE DRAMA.

- | | | |
|--|---|--|
| <i>Kinds.</i> {
(1) <i>Comedy.</i>
(2) <i>Tragedy.</i> | { | First English comedy, <i>Ralph Royster Doyster</i> , acted before Queen Elizabeth; composed by Nicholas Udall.
First English tragedy, <i>Gorboduc</i> ; by Sackville on classical model. |
| (c) <i>Theatres.</i> | { | (a) Inns and courtyards—acting in open air.
(b) First theatre, Blackfriars, greater part still uncovered.
(c) Before end of reign eighteen in London alone.
(d) Contrast between sixteenth and nineteenth century theatres. |

2. DRAMATISTS.

- Two Periods. {
- (a) *Chris. Marlowe*, greatest of 1st period. {
 - i. Short and dissolute *life*. *Style*, coarse and bombastic, yet full of passion.
 - ii. *Works* : chief, *Dr. Faustus*, i.e., *Faust* of Goethe.
 - (b) *Shakespeare*, the greatest English dramatist. {
 - i. Contrast with (a).
 - ii. Remarkable for large vocabulary wide experience of human nature, and wonderful delineation of character.
 - iii. *Works* : Comedies, tragedies, historical dramas.
 - (c) *Ben Jonson*, greatest after Shakespeare. {
 - i. Like (a) led dissolute life and died in poverty.
 - ii. *Chief Works* : Two comedies, *The Alchemist* and *Volpone the Fox*, belonging to later Elizabethan period.

3. POETRY.

- Spenser*. {
- (a) A pastoral and allegorical poet. Made a name for himself by the *Shepherd's Calendar*.
 - (b) *Chief Work* : *Faerie Queen*, an allegory. *Plot* : Twelve knights fight in defence of twelve virtues against their contrary vices. The Queen Gloriana personated Elizabeth.

4. PROSE.

- {
- Hooker*. A divine. Wrote *Laws of Ecclesiastical Polity*, a work on Church matters, written in rich language and elaborate style.
 - Francis Bacon*. A scientist ; the inaugurator of a new Philosophy. *Greatest work* : *The Advancement of Learning*.

III. Association.

Connect literature with history, manners and customs of the times, and show how the one is influenced by the others.

(Passages from Spenser and Bacon to be read to the class so as to enable class to perceive difference of their style from that of modern times.)

IV. Recapitulation.

What were the chief causes of the great advance of literature in this period? Describe the rise of the modern drama. Name the first comedy and tragedy in English. Who wrote *Dr. Faustus*, *Julius Cæsar*, *The Faerie Queen*, *Laws of Ecclesiastical Polity*, *Volpone*, *Advancement of Learning*? What was the character of each of these?

PROCEDURE.

I. Begin by asking pupils what was the great event in 1453, and how it affected literature in general, and why the revival was not felt in England till a century later. Draw from this that in time of war there is no opportunity for literature to advance, and ask whether it was likely to prosper in the time of the Tudors and especially Elizabeth. The dawn of a new and great period of English literature began with the fifteenth century, and reached its full meridian splendour in Elizabeth's reign, owing to the peace and prosperity at home, and the spirit of adventure and discovery abroad.

II. 1. (a) Tell class that the most striking characteristic of this period is the birth and rapid growth of the modern drama. Ask what were the only kinds of plays acted before this time, and what was their aim. (To teach the people morals and religion.) Can this be said of the modern drama? Describe its rise from the translations and imitations of the classical plays just then so popular at the Universities, helped on by encouragement from Elizabeth,

who was very fond of pageants and entertainments of all sorts.

(b) Ask what are the two kinds of dramas now quite common, and what is the difference between them.

The first original play was a comedy called *Ralph Royster Doyster*, composed by Nicholas Udall, to be acted before the Queen by the Temple students. Describe the plot briefly.

Two years later we hear of the first English tragedy (by Sackville), exactly on the model of ancient Greek plays—*Gorboduc*.

Tell the story, and point out it went to excess in tragic deeds, almost every character of any importance being murdered before the end! Compare this with any of Shakespeare's plays which were written shortly after. What must be concluded?

(c) Before considering a few of the greatest dramatists, we must take a glance at the places for acting in the early days of the drama. Draw from class where the Mysteries and Moralities used to be acted, and what were the rude attempts at scenery. The first theatre proper was built at Blackfriars in the beginning of Elizabeth's reign. Describe it, and compare with the many magnificent buildings of the present day. Call attention to the fact that no female actors were ever seen then; boys always acted their parts.

2. Let us now consider the character and works of the three greatest Elizabethan dramatists. Two of them are no longer acted, but the third is perhaps better appreciated now than in his own time. Ask who is our greatest dramatist. (Shakespeare.)

(a) Christopher Marlowe was the greatest of the first period of Elizabeth's reign. A man of passionate and dissolute character. Describe his end. (Stabbed in a tavern brawl.) Nevertheless a great genius. Name works. Ask who else has dramatised the legend of *Dr. Faustus*. In same way treat of Shakespeare and Ben Jonson, and compare their characters, lives, and, in consequence, the tone of their works.

3. This general outline of Elizabethan literature would not be complete without referring to the poetry and prose of the period, though not so important. The greatest poet was Edmund Spenser—a pastoral and allegorical poet. (Ask meaning of these terms.) Mention his two chief works, and show how the *Faerie Queen* is a true allegory.

4. Among the prose writers of the period may be mentioned Hooker, a divine, who wrote a prodigious work on Church matters (give name). Also Francis Bacon, the great originator of experimental science. (Ask meaning and explain.) He belongs in great part to a later period, as most of his works, and among them his greatest, *The Advancement of Learning*, were written in James I.'s reign.

Might mention that Ben Jonson's play, *The Alchemist*, was lately produced in London by the Society of Players—that modern critics found dialogue too lengthy and action too little.

LESSON ON ELIZABETHAN ENGLISH AS ILLUSTRATED BY AS YOU LIKE IT.

Class—Oxford Junior Grade. *Time*—Fifty minutes. *Aim*—To exercise judgment of the class in discovering the Elizabethan English in Shakespeare.

MATTER.

I. Preparation.

1. Refer to diffi-
culties in read-
ing { Chaucer.
Spenser.
Shakespeare.
2. Cause of
changes. { Living languages.
Cf. dead languages.

II. Presentation.

1. *Elizabethan
English.* { Why important.
Rise of drama.
Literature increased.

2. *Effects of Period
on Language.*

- (a) Transition period in English language.
- (b) Influx of new discoveries — new thoughts require new words.
- (c) Revival of classical translations of Latin and Greek authors caused change of construction.
- (d) Destruction of inflections; therefore experiments made.

(a) Any part of speech used for any other:

“Thou speakest *wiser* than thou art ware of” (Act ii., 4, 52)—adjective for adverb.

“In their barks my thoughts I’ll *character*” (Act iv., 2, 6)—noun for verb.

“Let no face be kept in mind but the *fair* of Rosalind” (Act iii., 2, 84)—adjective for noun.

(b) Double negatives for emphasis:

“Nor did not with unbashful forehead” (Act ii., 3, 50).

“I cannot go no further” (Act ii., 4, 8).

Double comparatives for emphasis:

“A more sounder instance” (Act iii., 2, 55).

(c) Omission of relative:

“But that . . . they call compliment” (Act ii., 5, 22).

“But is there any else . . . longs to see, etc., . . . is there yet another . . . dotes upon rib-breaking” (Act i., 2, 127, 128).

(d) Quasi-singular verb and plural subject (accounted for by the fact that play was written to be spoken):

3. *Some Points of
Difference.*

3. Some Points of Difference.

- "There comes an old man and his three sons" (Act i., 2, 106).
- "There is none of my uncle's marks upon you" (Act iii., 2, 339).
- "There comes a lover of mine and a lover of hers" (Act v., 2, 67).
- (e) Formation of participles—tendency to drop "en":
 - "He would not have *spoke* such a word" (Act i., 1, 77).
 - "If thou hast not *broke* from company" (Act ii., 4, 37).
 - "Why I have eat none yet" (Act ii., 7, 88).
- (f) Unsettled accent due to tendency to retain Latin accent *versus* inclination to put English accent; therefore changes took place in the same word:
 - "Now my co-mates and brothers in exile" (Act ii., 1, 1).
 - "And as mine eye doth his effigies witness" (Act iii., 7, 193).
 - "The quintessence of every sprite" (Act iii., 2, 128).

III. Association.

Compare differences of

{ Chaucer's English.
Norman English.

Also change of

{ Customs, manners, environment, ideas,
etc.

IV. Application.

Good features in Elizabethan English. { 1. Freedom.
2. Brevity.
3. Vigour.

"Artless and unlaboured harmony seems to be the heritage of Elizabethan poets."

V. Recapitulation.

1. Influences affecting Elizabethan English.
2. Chief differences.
3. Pupils to discover for themselves *one* example of each point.

PROCEDURE.

I. 1 and 2. Question the class as to reason of difficulties found in reading old English authors—Chaucer, Spenser (write lines from each on blackboard) and Shakespeare. What is the cause of this? Contrast Latin and Greek—why not so difficult to those who know the language, although older than Shakespeare's works. Why this difference? What do we call languages which change? Those which do not change? What sort of English do we meet in Shakespeare? What is his age called?

II. 1 and 2. This Elizabethan age is of importance—why? What arose at this time that made Shakespeare such a great poet? How was literature increased at this period, and why? There were many events and circumstances which affected the language at this time. We shall try to find some. Then question so as to elicit Revival of Classics, discoveries at sea and on land, and results of each to language. The language was in an unsettled state (refer to periods of English), and, therefore, while people were altering spelling, construction, inflections, etc., what would this licence lead to? A variety of methods; no settled laws.

3. Now we shall see how some of these irregularities are to be found in Shakespeare's English:—

(a) Any part of speech used for any other. (Quote examples, and ask reason for such change and irregularities.)

(b) The poets of the age tried to be emphatic and brief: hence often double negatives (quote examples, and question on them), also double comparatives. (Cf. modern sense of such.) The Elizabethan authors aimed at brevity. What would this naturally lead to in their writings? Omissions, but not such as to destroy the sense. (Quote examples, and

ask the class to supply the missing word.) What was the end for which Shakespeare's plays were written? Was it to be read by future generations? (To be acted at the time: hence they were written to be spoken.) This fact has led to some irregularities, as, for instance, singular verb and plural subject. Elicit reason for this, and quote examples.

This period of English forwarded loss of inflection. Give examples.

What influences affected language by revival of learning, and what words would be likely to come into the language at this time? This led to the unsettled accent on words—some tended to the *Latin* accent and some to the English accent; therefore changes took place in the same word. (Quote examples.)

III. Now these are the chief differences we have to encounter in Elizabethan English as read in Shakespeare. Now, if we were to read Chaucer, would our difficulties be greater or less? (Show, by reference to Chaucer's Prologue, that spelling would be quite different, more inflections, and pronoun *it* not used yet.) Is there any other influence which would affect the language of an author? Surroundings, manners, customs: hence passages that would not have sounded coarse according to customs in those times would do so now.

IV. Still, although these difficulties exist, how does the language of Shakespeare rank to-day? What quality would result from neglect of rules? from omissions and peculiar construction? and from emphasis and force? A certain writer has said, "Artless and unlaboured harmony has seemed to be the heritage of Elizabethan poets". Cf. effect of laboured efforts at harmony, etc., by moderns, and the result not to be compared with Shakespeare.

V. Recapitulate by questions on points given.

NOTES OF A LESSON ON THE DICTION OF POETRY.

(Illustrations from *Richard II.*, Clarendon Press Ed.)

Class—Pupils from 13 to 15 years. *Time*—Three-quarters of an hour.

Aim—To lead class to an appreciation of the niceties and beauties of language and so cultivate a critical taste.

MATTER AND VERBAL ILLUSTRATIONS.

I. Preparation.

Why poetic diction should differ from prose. $\left\{ \begin{array}{l} (a) \text{ Poetry and prose differ in their object, the one mainly is to give pleasure, the other information: hence} \\ (b) \text{ On account of form poetry is limited by exigencies of} \end{array} \right. \left. \begin{array}{l} \text{one must be beautiful, the other clear.} \\ \text{rhyme, metre.} \end{array} \right.$

II. and III. Presentation and Association.

Some marks of poetic diction.

1. It is rendered picturesque by:—

(a) Use by preference of unfamiliar words, *e.g.* : $\left\{ \begin{array}{l} \text{woe, for sorrow, p. 49.} \\ \text{alack, alack, for woe.} \\ \text{"why he cometh hither" (for here), p. 49.} \\ \text{"our eyes do hate the dire aspect," p. 13.} \\ \text{"'tis nameless woe, I wot" (for know).} \\ \text{"to bear the tidings of calamity."} \\ \text{"for yond methinks he stands," p. 49.} \end{array} \right.$

(b) Figures of speech. $\left\{ \begin{array}{l} \text{Simile.} \\ \text{"Edward's seven sons were as seven vials," p. 7.} \\ \text{"Be swift like lightning," p. 12.} \\ \text{"In rage deaf as the sea, hasty as fire."} \end{array} \right.$

- | | | | |
|--|----|--|---|
| (b) Figures of speech. | of | } <i>Meta-
phor.</i> | “My oil-dried lamp shall be extinct.” |
| | | | “My inch of taper,” p. 16. |
| | | | “Ere my tongue shall wound,” p. 6. |
| | | | “Thou most beauteous inn,” p. 66. |
| | | | “Time made me his numbering clock,” p. 79. |
| | | | “This precious stone set in the silver sea,” p. 21. |
| | | | “Men are but gilded loam.” |
| (c) Personification and personal metaphor. | } | “That strew the green lap of the new come spring.” | |
| | | “Might fright fair peace.” To wake, p. 13. | |
| | | “Some of . . . by the Destinies cut,” p. 7. | |
| | | “Truth hath a quiet breast,” p. 12. | |
| | | “ignorance . . . a gaoler,” p. 14. | |

2. It is rendered terse and euphonious :—

- (a) By the use of epithets.
- | | |
|---|--|
| { | "The <i>sullen</i> passage of thy <i>weary</i> steps," |
| | p. 17. |
| | " <i>Vassal</i> hand," p. 49; "my <i>stooping</i> |
| | duty," p. 48. |
| | "my <i>weeping</i> eye," p. 9; "maid-pale |
| | peace," p. 49. |
| | "a ceremonious leave." |
| | "the fearful bending of my knee." |

- (b) By the suppression of words and particles.
- | | | |
|---|---|---|
| Antecedent and
relatives, <i>e.g.</i> ,
objectives. | { | “Is near the hate of
those [who] love
not.” |
| | | “And duty bids defend,”
p. 32. |
| | | “That receipt [which]
I had,” p. 5. |
| Conjunctives: <i>e.g.</i> , | { | “He would have
been so brief,” p. 47. |
| | | Particles: “Venge,” p. 8; “’gainst,” p. 15. |

Summary : The choice of words in prose and poetry is affected by the widely different objects of these, one being to give information, must be clear before all else, the other must be beautiful before all else. This is secured by certain artifices, *viz.*, the use of figures of speech, the use of epithets, the suppression of all unnecessary words and the use of unfamiliar words provided always they be more euphonious.

IV. Recapitulation.

1. Name some devices of poets in order to give beauty to their passages.
2. Quote one metaphor from *Richard II.*
3. What faults may metaphors have?
4. Give examples.
5. Name the chief Shakespearian device for shortening and beautifying expression of his ideas.

PROCEDURE.

1. Introduce lesson by pointing out to class that the object of the ordinary prose writer is to impart either some information or a moral lesson. Draw from them that *clearness* is the first thing the writer aims at. Nothing will excuse a fault against clearness. Question them as to difference of poetry. Ask if it is as a rule clear and easy to understand. Is this counted a fault? Show that some kinds of rhetoric prose, impassioned speech, etc., very closely resemble poetry. Why? Because beautiful. Draw from class meaning of word *diction*. What other limitations as to diction in poetry? Give examples.

(a) Remark at opening that *Richard II.* is chosen as means of illustration only because of utility. Other plays, as *Midsummer Night*, *Tempest*, etc., more poetic. An historical play more like prose. Beauty dependent on pictures; prove this. Write on board one or two examples, and question as to the word that would betray the quotation to be from verse. Give reasons as to *metre* and *novelty* for use of "*hither*," "*dire*," "*wot*". Show from "*yond methinks*" that metre is not always dictating principle. Make pupils supply second syllable, "*yonder I think*";

read this aloud. Draw from class it is *commonplace*, and that this alone makes it unsuitable.

(b) Give some examples, *e.g.*, "Quick as thought," "White as snow," etc., to show that *comparison* forms a large part of our speech. Elicit two or three figures of comparison, and get definition from class.

Quote some similes and get others from class. Turn one of the examples into a metaphor. Show increase of *force*. Compare to colour scheme in painting. Contrast needful to art.

Take one or two metaphors, "Men are but gilded loam"; work out the comparison fully. Point out how metaphors may fail—may be mixed, *e.g.*, "He smelt a rat, he saw it brewing in the air, but he would nip it in the bud". Draw from class why the Parliamentary orator who was guilty of this failed. Give another example from text, *e.g.*, "Who when they see the hours *ripe* . . . will *rain hot vengeance*". Ask pupils to alter so as to make metaphor consistent. Point out fault of too many details, *e.g.*, passage beginning "Time made me his numbering clock". Show fault. Call attention to "even in the glasses of thine eyes," etc. Show part of this is literally true; therefore not good as an effective metaphor. Read "ere my tongue shall wound . . . or *sound*". Question as to fault of metaphor. (Recap. 1 by a few questions.)

(c) Pass on to Personification, treating examples after same mode.

2 (a) Coming to the use of epithets, point out that class is now to examine a favourite Shakespearian device. Select first passage quoted in matter, and *expand the ideas* in *sullen* and *weary*. Ask class how it gains. Show that one word *makes a picture*.

Do this with two or three examples, and then draw from class the terms Terse and Euphonious.

(b) In same manner go through next point, asking class to supply omissions.

INTRODUCTORY LESSON TO AS YOU LIKE IT.

Class—Oxford Junior Grade. *Time*—Three-quarters of an hour.
Previous Knowledge—The story of the play. *Aim*—To give the class notions of the general character of the play and its place among Shakespeare's works, so as to form a foundation upon which the course of lessons may be built.

MATTER.

I. Preparation.

1. Refer to different styles of Shakespeare's dramas.

(a) Legendary.	}	Tragic, melodramatic.
(b) Historical.		
(c) Fiction.		
2. Examples of each.

(a) <i>Midsummer Night's Dream.</i>	}	
(b) <i>Richard II., Henry V.</i>		
(c) <i>Merchant of Venice, As You Like It.</i>		

II. Presentation.

1. Style of Play: *As You Like It.*

(a) One of Shakespeare's later comedies.	}	Best of them with <i>Midsummer Night's Dream.</i>
(b) Pastoral. Scenelaid in a forest (Arden).		
(c) Written after <i>Henry V.</i>		

Therefore scene in France, and from camp and Court to forest and country.

2. Story and its Sources.

(a) Lodge's <i>Tale of Rosalynde.</i>	}	Rosalind, Celia, Orlando.
(b) Chief characters.		
(c) Title of play.		

i. Dedication of Lodge (Cl. Press Ed., p. viii.). ii. As reply to criticism of Ben Jonson.

3. Circumstances connected with Play.

(a) Shakespeare took part of Adam.	}	
(b) Why Shakespeare philosophises about adversity.		
(c) He mocks the folly of the Court.		
(d) The refinement of the jester's jokes.		

111. Association.

1. With *Midsummer Night's Dream* as to style.
2. With other plays, where woman is the chief character.
3. With *Hamlet*, as Shakespeare took part in it also.
4. Contrast Shakespeare's delineation of character with Dickens's method.

IV. Application.

1. *Shakespeare's Intention.*

{	<p>(a) To show types of love in Court and in the country.</p> <p>(b) The refinement of fun and laughter.</p> <p>(c) To look at formalities of the Court in their true light.</p>
---	--

V. Recapitulation of chief points connected with style of play, source of the story, chief characters and any circumstances connected with the plot.

Blackboard sketch (filled in as the recapitulation proceeds).

PROCEDURE.

I. 1 and 2. Introduce lesson by questions on the different plays of Shakespeare known to class, those they have learnt, and deduce the three classes—Historical, Legendary and Fictitious. Ask what prose works fall under this last class. Refer to the fact of the plot being the product of the imagination or taken from some work of fiction. Give examples of each, and then elicit from what they know already of *As You Like It* that it is a play of fiction and a comedy.

II. 1. We see then that it is a comedy, and is considered one of Shakespeare's best with *Midsummer Night's Dream*. The scene of *As You Like It* is laid in a forest, therefore what kind of comedy is it? (Pastoral.) The Forest "Arden". Two suppositions as to name. Where have we allusion to the Ardennes? This play was written after *Henry V*. Draw from class contrast in style—from Court to country and forest; and that Shakespeare's own circumstances at the time made him bitter against the follies of the Court, and inclined him to philosophise on adversity.

2. The story is not original, but taken from a novel called *Tale of Rosalynde*, written by Lodge about Shakespeare's time, and Lodge had already borrowed it from some one else. (Refer to the idea prevalent at that time with regard to original plots.) Elicit chief characters—Rosalind, Celia and Orlando—by reference to story of play. Origin of title uncertain. Supposed to have been taken from a passage in Lodge's dedication. (Make class read it together from textbook, Cl. Press Edition.) Second supposition is that it is a mocking reply to Ben Jonson's criticism on the comedies of Shakespeare.

3. In connection with this play we may note that Shakespeare himself took a part, that of Adam (this and Ghost of *Hamlet* are the only parts which it is certain he took). Relate legend about his brother having seen him. Refer to personal troubles, and as a result his philosophy about Court. Touchstone the most refined jester of Shakespeare. "His wit was half foolery, his foolery half wit."

III. As in this and other plays, the character of women comes out strong. Cf. Portia in *Merchant of Venice*. Compares with *Midsummer Night's Dream* in style and fun; with *Hamlet* in part taken by Shakespeare. Plot not much in itself, but out of sentiments and characters interest arises rather than events and situations. Contrast with Dickens in character drawing. Shakespeare's characters are from within, Dickens's from without. Resulting in drama and prose respectively.

IV. Question as to results often effected by a poet's or a prose writer's works (Dickens, Besant, etc., etc.). Dreyfus case. . . . Shakespeare's intention in this play was to show up the types of love in the high-born maiden and in the peasant. The jokes made are more refined than those in other plays, and he aimed at exposing the formalities of the Court in their true light.

V. Recapitulate chief points of style, source of story and circumstances connected with the play in general.

Set class a question, requiring as answer the substance of lesson given. This to be answered in writing.

LESSON ON THE DATE OF AS YOU LIKE IT.

Class—Oxford Junior Grade. *Time*—Three-quarters of an hour.
Aim—To exercise judgment of the class in deciding date from proofs evident, and to interest them in circumstances connected with the play.

MATTER.

I. Preparation.

- i. Means of ascertaining Date. { (a) Why difficult. No date given by S.
 (b) Whether belonging to early or later period.
 (c) External evidences.
 (d) Internal evidences.

II. Presentation.

- i. Extrinsic Proofs. { (a) Entry :
 i. Entered in *Stationers' Register* with *Henry V., Much Ado About Nothing, Every Man in His Humour*—Ben Jonson.
 ii. "To be staid," i.e., not printed, date 4th August; no year given. Only printed in 1623.
 iii. Previous entry, 27th May, 1600, 1601.
 iv. Name not mentioned by Mere, } Cf. *Merchant of Venice*,
 1598. } *Richard II.*
 (b) Allusions :
 i. "Whoever loved, that loved not at first sight" (Act iii., 5, 82)—quoted from Marlowe's *Hero and Leander*, published in 1598.
 ii. "Like Diana in the fountain" (Act iv., 1, 134)—probable reference to statue at Cheapside, 1596, for a fountain.
 iii. "They are all like one another as half-pence are" (Act iii., 2, 327)—

- half-pence only coined in 1582-83, reign of Elizabeth.
1. *Extrinsic Proofs.* { iv. Possible reference in v., 2, 63, and iv., 1, 164, but would put date too late.
Therefore possible date 1599 or 1600.
- (a) Style and mode of thought influenced by signs of premature age in Shakespeare due to adversity, loss of friends, etc.; therefore a *later* comedy.
- (b) Language alive with imagery. Grouping of characters not so artificial.
- (c) *Verse tests* :
2. *Intrinsic Proofs.* { i. *Run on verse* and not end stop as in early plays (Act ii., 1, 3, 10, 56).
ii. *Feminine endings*, body (Act ii., 1, 8, 64; Act ii., 2, 9)—18% in play.
iii. *Less rhyme* in later plays (*cf. Richard II.*). Unimportant matter *not* in rhyme (Act i., 1, 2; Act iii.).
iv. *Speech end test* (Act i., 2, 272; Act ii., 1, 17, 43; Act iii., 5, 27; Act v., 4, 158).

III. Association.

1. *Compare the Influences of the Date on the Play.* { (a) History of the times.
(b) Personal history of writer.
(c) Contrast in this case with *Henry V.*
(d) Age when written.

IV. Recapitulation.

1. Means of discovering date.
2. External evidences.
3. Internal evidences. } Examples.

V. Application.

Get class to observe and discover for themselves some internal evidences of later comedy, as

Run on verse.

Feminine endings.

Speech end test.

PROCEDURE.

I. Question class on meaning of date of the play, and why the difficulty has arisen about deciding the date. Which are the periods of Shakespeare's works? What sort of differences would one naturally expect to find in an author's later and his earlier works? There are two evidences which help to give date—first, those external to play or connected with it, or *extrinsic* (give derivation); others *internal*, or change in the play itself.

II. Now we shall find what external proofs we can find as to the date of the play. First, the entry (here explain meaning of entry) gives when *As You Like It* was entered; year not put, 4th August, and "to be staid," *i.e.*, printed 1623. Some clue is given by the fact that the previous entry was in 27th May, 1600, and next 1603. What will conclusion be then? 1599 or 1600. Just about opening of Globe Theatre, where it was acted (Adam). Not mentioned in Mere's list, and this was entered in 1598. Must be between 1598 and 1600.

1. Allusions in play may also help us as to date. Why? Here point out and let the class read in text, and explain allusions to Marlowe's work, Diana fountain, half-pence (coined 1582). (Who was reigning?) Also *possible* reference to statutes passed against oaths—v., 2, 63; iv., 1, 164; but these last quotations mentioned are not supposed to have any intentional reference on the part of the author. (Here recapitulate external evidence.)

2. Deduce the mode of thought brought out by the author; its cause; and hence date of play about time of Shakespeare's temporal troubles, loss of friends, etc. . . . One of his *later comedies*. If later, shall we expect to find it better from a literary point of view than former plays? Why? One of great tests of date and *internal* evidence is the *verse test*—(a) *Run on verse*, seen in later plays. (Point out and show examples.) (b) *Feminine endings*. (Explain and point out passages marked.) (c) *Less rhyme* in later plays. Why? Prose more perfect in style and form, also the play lends itself to prose, as there is much conversation, and

unimportant parts are generally prose. (d) Speech end test—the broken line. Also seen in *Richard II.* (Show passages marked.)

III. How could the date of composition influence the play itself? History of times affect the mind of the poet? Personal history? How shown in this case? Coming after *Henry V.*, what effect did this produce in scene, place, character and contrasts, and lastly, age of the poet? Mature—lost the glare of worldly goods—sees by experience use of sorrow and adversity—learnt by experience.

IV. Recapitulate internal evidence, verse test and language, and ask some of the examples that were pointed out and shown.

V. Make class discover for themselves some of the internal tests for next lesson—as *run on verse*, *feminine endings*, *speech end tests*.

Blackboard Sketch.

		Date of Play.
Means of discovery	{	External.
		Internal.
External	{	Entry (a).
		Allusions (b).
	{	1. Style and mode of thought.
		2. Language.
Internal	{	3. Verse test { (a).
		(b).
		(c).
		(d).

NOTES OF A LESSON ON ACT II., SCENE I, SHAKESPEARE'S AS YOU LIKE IT.

Class—Oxford Junior Grade. *Time*—Three-quarters of an hour.

Aim—To give the class increased literary knowledge; to stimulate their imagination, and so lead them more easily to realise the play in an appreciative manner.

GENERAL PLAN AS TO MATTER SELECTED.

I. Preparation.

Class to read whole of scene before the lesson.

II. Presentation.

I. Analysis of Scene.

It describes background of action.

Natural : see "winter's wind," "antique oak," "brawling brook".

Moral : the Duke, "happy is your grace". Jaques, "weeping and commenting".

It adds nothing to action, but contains several beautiful and well-quoted lines, e.g., "Sweet are the uses of adversity".

2. Discussion of the Duke's opening Speech.

Words and phrases selected.

Explanation or appreciation of.

(a) co-mates.

the redundancy, cf. brothers.

(b) old custom of the season's difference.

mode by which Shakespeare marks *length of exile*.

(c) painted pomp.

Alliteration : notice contrast continued.

(d) envious court.

figure of speech and *force of envious*.

(e) the penalty of Adam.

classical, not *biblical*, cf. *golden world*.

(f) icy fang and . . . churlish chiding.

contrast *fang, bites, chiding, blows*.

of winter's wind.

work out figure of speech.

(g) no flattery—counsellors that *feelingly*.

force of *feelingly*. Paraphrase passage.

(h) Sweet are the uses of adversity.

Paraphrase.

. . . venomous.

wears yet a *precious jewel*, etc.

Note the familiar and oft-quoted lines "Sermons in stones," and paraphrase and give general meaning.

(i) "Happy is your grace," etc.

Deduce—i. That the Duke is resigned, nay, content.

ii. That he must be magnanimous.

iii. That Amiens admires him.

III. Recapitulation.

A few questions of general import, *e.g.* :—

1. Give a very brief description of the forest.
2. What is the function of this scene in the play ?
3. Why does Shakespeare lead Orlando to Rosalind in the forest ?
4. Repeat the lines about adversity.

IV. Assimilation.

As a written exercise the class may sketch from memory the forest and the personages, or paraphrase one or other speech or learn some lines by heart.

PROCEDURE, QUESTIONS AND ORAL DEMONSTRATIONS.

I. Teacher begins by reading to class last two lines of Act i. :—

Celia.— “ Now go we in content
To liberty, and not to banishment.”

Point out that these lines prepare our minds for the scene which Shakespeare is now to put before us, in which we see the forest that is to be the place where Rosalind's fortunes are to be played out.

Who are the characters in this scene ? What relation is there between the Duke and Rosalind ? and why is the former in banishment ? Quote some phrases from the text which picture the forest for us. (“ Winter's wind,” “ antique oak,” “ brook,” etc.) Point out to class that the poet is here deftly and with great art making the personages *describe* Arden. Draw from them greater need of this in his day, when stage properties were rude. If any place in locality lends itself to contrast, here direct attention to it. Why is Shakespeare so particular as to his background ? How will it affect the life of Rosalind and Orlando as conceived by us ? With what other life will it contrast ? Given his upbringing, in which life will Orlando show to most advantage ? Where do we first see this truth ? (Wrestling match.)

Next show that not alone our natural surroundings, but those with whom we associate colour our lives, and therefore

Shakespeare carefully discloses to us the personages with whom his hero and heroine are to be thrown.

How does Amiens comment on the Duke's first speech? ("Happy is your grace," etc.)

What does this tell us of the Duke's character? What do we learn further from the lords about Jaques? ("Weeping and commenting," etc.)

Do the lords criticise this adversely? If not, what of *their* characters?

Is there any incident at all in the scene? Why finally did Shakespeare write it?

II. Next the teacher proceeds to read or let a member of the class read the Duke's first speech, and then discuss the words and phrases in something like the following mode:—

(a) *Co-mates*: 1. What is the meaning of particle *co*? Give examples of other words. (Co-workers, etc.)

2. What is the meaning of *mates*?

3. What do you call this doubling? Why does the poet use it?

Is there any other word pointing to the same idea?

Old custom: Suppose the Duke had merely said *custom*, what would have been implied? But if the custom is *old* what further is implied? Find another phrase that marks the lapse of time in exile. ("Season's differences.")

Note.—All the other phrases are commented on after the same mode, the teacher putting searching questions, connecting the force of passages, and only supplying what pupils cannot find out.

NOTES OF A LESSON ON ACT II., SCENE 3, OF AS YOU LIKE IT.

Class—Oxford Junior Grade. *Time*—Three-quarters of an hour.

Aim—To cultivate a literary taste and to increase the appreciation of class for Shakespeare.

MATTER.

I. Preparation.

Class read through scene before coming to lesson.

Subject-matter recalled briefly by a few searching questions.

II. Presentation.

1. *Analysis of Scene.*

- Its function in the play :
- (a) To bring into relief the gentleness and loveliness of Orlando's character, and thus to heighten our appreciation of the hero of the play.
 - (b) To advance the action of the play by preparing us for the sojourn of Orlando in the forest, where his good qualities will appear to advantage.

2. *Discussion of Orlando's and Adam's Speeches.*

- | | | |
|-----|--|--|
| | <i>Words and phrases selected.</i> | <i>Give explanation or appreciation of.</i> |
| (a) | "O you memory of old Sir Roland." | Memory for memorial; use of abstract for concrete. |
| (b) | "Why would you be so fond." | Would you = were you desirous. |
| (c) | "The bonny priser of the humorous duke." | humorous = whimsical. |
| (d) | "Your virtues are sanctified and holy traitors to you." | redundancy {sanctified and holy}, figure of speech, personification. |
| (e) | "When what is comely envenoms him that bears it." | allusion to poisoned robe sent to Hercules. |
| (f) | "I will rather subject me to the malice of a diverted blood and bloody brother." | Orlando's nobility of character in preferring to suffer evil rather than commit it. <i>Diverted blood</i> : the feeling of a relation turned from its proper course. |
| (g) | "The thrifty hire." | use of thrifty— <i>Hypallage</i> . Cf. "youthful wages," "weak evils". |
| (h) | "When service should in my old limbs lie lame." | alliteration and metaphor. |

- (i) "And unregarded age expand metaphor into a simile in corners thrown."
- (j) "He that doth the ravens feed, be comfort to my age." Shakespeare's religious mind in thus expressing trust in God's providence.
- (k) "My age is as a lusty winter, frosty but kindly." use of *kind* to mean seasonable, natural. Cf. use of *kind*, iii., 2, 87, "cat will after kind". Figure of speech simile.
- (l) Give substance of Orlando's last speech.
To be deduced by class :
- i. Character of Adam from his speeches.
 - ii. Shakespeare's modesty in choosing to act the part of Adam, one of minor characters in the play; also how Shakespeare must have entered into the character of Adam since in acting his part he was giving expression to his own sentiments.
 - iii. To notice rhyming passage—a thing unusual in play—occurring generally at the close of a speech or scene.

III. Association.

Refer to source of *As You Like It*, i.e., Lodge's novel.

Contrast Shakespeare's treatment of the relations between master and servant, and point out to class how much truer Shakespeare is to nature.

IV. Recapitulation.

1. What is the function of this scene in the play?
2. What light does it throw on Shakespeare's own character?
3. What classical allusions are in this scene? What Scriptural allusions?
4. Give two instances of figures of speech.
5. Quote some lines revealing Orlando's love of what is right.

PROCEDURE, QUESTIONS AND ORAL ILLUSTRATIONS.

Introduce lesson by recalling Shakespeare's intention in choosing the forest as the scene of the greater part of the play, *i.e.*, to bring into prominence all Orlando's good qualities, these surroundings being more calculated to do so than those of the Court.

Questions: Who are the only persons in this scene? What effect has this limitation to two persons on our minds? To whom does Shakespeare wish to direct all our attention? What points in Orlando's character are brought out in this scene? Point out Shakespeare's choice of the situation in which to bring Orlando before us. The dialogue is between master and servant, and the words of each serve to bring out Orlando's nobility and loveliness. What sentiments towards his master does Adam's first speech reveal? What are Orlando's feelings towards his old servant? Adam's loving admiration for his master and Orlando's respectful words to his aged servant show us the delicacy of his treatment of inferiors. The fact, too, that Adam had spent his years from "seventeen till almost fourscore" in the service of Orlando says much for the character of both Orlando and his father. How does this dialogue at once affect our feelings towards Adam? By what means has Shakespeare previously endeavoured to win our admiration for Orlando? Did he succeed then? Has he succeeded now? The effect of this scene, then, is to increase our admiration of the hero, and to make us desirous of following his fortunes. What, then, is the function of this scene? To advance the action of the play by preparing us for Orlando's stay in the forest.

Read through Adam's first speech, and ask following or similar questions:—

Why does Adam in a manner regret his master's virtues?

Phrases: 1. What is meaning of *memory* here? Who was old Sir Roland?

2. What is the meaning of "fond"? the force of "would you"?

3. To what incident does this refer? Who is the "bonny priser"? The humorous Duke?

Why does Adam regret Orlando's having overcome the wrestler? Who else was affected in a different way by Orlando's success. Comment on the word *humorous* here, meaning whimsical. Show how the Duke deserves the epithet by his conduct towards Rosalind and his change of feeling towards Orlando after the wrestling match, simply because he was the son of Sir Roland, whom the Duke's father hated.

4. What does Adam mean by these words? Notice how beautifully Shakespeare clothes his ideas. He gives expression to the same idea in *Hamlet*, "Breathing like sanctified and pious bonds, the better to beguile" (i., 3, 130).

What figure of speech is this? What is noticeable about the two adjectives in the line? What effect on the idea has the repetition?

5. Notice the classical allusion, and tell the incident of Hercules and the poisoned robe.

6. What point do these words bring out in Orlando's character? What is the meaning of "diverted blood"?

7. What is the meaning of "thrifty"? of "hire"? Is it the wages that are thrifty? Give examples of this transference of adjective. (Needless stream, weak evils, youthful wages.)

8 and 9. Note alliteration and metaphor, which, expanded into a simile, would run thus:—

"I should be cast aside in my old age, just as useless things are thrown into a corner." Would Orlando be the man to cast off his servant?

10. Notice Shakespeare's religious-mindedness in his reference to Providence.

11. Note the simile of the use of "kindly" to mean seasonable.

Class to give Orlando's speech in their own words. What do we learn of Adam from his speeches? What is Adam's function in this play?

Recapitulate as in matter.

PARTS OF A SIMPLE SENTENCE.

Class—Average age, 12. *Time*—Half an hour. *Previous Knowledge*—Subject, predicate and object (direct). *Aim*—To exercise pupils' understanding and teach them to generalise.

MATTER.**I. Preparation.**

1. *Examples.* { (a) The boy skates.
 (b) The boy loves games.
 (c) The good boy desires to please his master.
 (d) Walking in the woods is pleasant.
 (e) "Alas!" said she.
2. *Analyse* above examples under head of subject, predicate, and object.
3. *Define* sentence, subject, predicate, object.

II. Presentation.

- (1) *Essential Parts.* { (a) Subject.
 (b) Predicate.
 (c) Object if (b) is transitive.
- (2) *Non-essential Parts.* { (a) Enlargements of subject.
 (b) Indirect object.
 (c) Extension. { i. Time.
 ii. Place.
 iii. Manner.
 iv. Cause.

Further Examples to illustrate 2 :

1. Diligent children receive their reward at the distribution of prizes.
 2. The kind master gave a holiday to his pupils yesterday.
 3. He took them to London by train, as a reward.
- (2) *continued :*
- (a) *Enlargement* consists of adjective or phrase qualifying subject or object.
 - (b) *Indirect object* denotes person or thing indirectly affected by the action, through medium of a preposition.
 - (c) *Extension* or enlargement of predicate denotes circumstances of time, place, manner or cause.

III. Association.

Analysis of last Examples.	{	Subject : The master
		Enlargement : kind
		Predicate : gave
		Extension : yesterday (time)
		Object (direct) : a holiday (indirect) : to his pupils.

IV. Recapitulation.

What are the essential parts of a sentence? What are the non-essential? What does indirect object denote? How many kinds of extension? Give examples of each.

V. Application.

Ask class to form a sentence with direct and indirect object; another with two kinds of extension; also make pupils analyse: "Grateful children make a return to their parents in their old age by their love and care".

PROCEDURE.

I. Begin lesson by asking the definition of a sentence. Ask for a few examples, and write some on blackboard, supplying some such as given in matter. Ask for the subject in each case, and what it denotes, and how found. Also for predicate. Draw from class whether predicate is complete or incomplete. If the latter, as in (a) and (e), how is it completed? What name is given to completion? Write analysis of one or two sentences.

II. Elicit now from class what are the necessary parts in every sentence; then refer to (c) and (d), and ask what unnecessary words are in the subject; what are their use? To *enlarge* or give us a *larger* knowledge of subject, therefore called *enlargement*. Next give further examples (1) and (3). Ask for enlargement of subject in (1). Get class to analyse sentence. Ask to what "At the distribution" refers, and thus elicit that it enlarges or *extends* the meaning of the predicate, therefore is called *extension*. Now analyse (3), elicit the kinds of extension, and ask for other examples of extension of time, place, etc.

III. Lastly, give sentence (2), and point out that the master cannot give a holiday without giving it to somebody. By comparison with *direct* object which completes the sense *directly*, show that "his pupils" completes it *indirectly* through a preposition. Some verbs need such a completion, *e.g.*, give, send, take, etc. Ask examples of these, and which are the direct and which the indirect objects.

IV. To exercise class in enlargement, object and extension give sentences, and ask pupils to supply different parts.

V. Lastly, write sentence in application on blackboard, and analyse it with class.

Conclude lesson by questions in matter and examples given.

ANALYSIS AND PARSING OF A PIECE OF POETRY.

Class—Oxford Preliminary Grade. *Time*—Half an hour. *Previous Knowledge*—The structure of the simple sentence. *Aim*—To exercise pupils' understanding and teach them to analyse.

MATTER.

Extract.—First two verses of Cowper's *Boadicea*.

"When the British warrior Queen,
Bleeding from the Roman rods,
Sought with an indignant mien,
Counsel of her country's gods;
 Sage beneath a spreading oak
Sat the Druid, hoary chief;
 Every burning word [which] he spoke
 [Was] Full of rage and full of grief."

Herbartian Steps.

I. Preparation.

1. (a) Meaning of predicate.
 (b) Number of sentences depends on number of predicates.
 (c) Underline predicates in extract.
2. Subject to each predicate found by question *who* or *what*.

II. Presentation.

When . . . gods (first sentence).	{	Subject : The Queen
		Enlargement : British warrior bleeding, etc.
		Predicate : sought
		Object (direct) : counsel (indirect) : of her country's gods
Sage . . . chief (second sentence).	{	Extension : with an indignant mien.
		Subject : The Druid
		Enlargement : hoary chief
		Predicate : sat
Every . . . grief (third sentence).	{	Extension : beneath a spreading oak (place) sage[ly] (manner)
		Subject : word
		Enlargement : every burning
		Predicate : was full
(Fourth sentence).	{	Object (indirect) : of rage and grief.
		Subject : He
		Predicate : spoke
		Object : which

Parsing of words underlined :

British : Proper adj. of qual., qualif. *Queen*.

Bleeding : Pres. part. of irreg. intrans. verb *to bleed*,
referring to *Queen*.

Sought : Irreg. trans. verb, act. v., ind. m., past tense,
3rd per. sing., to agree with subj. *Queen*.

Country's : Com. n., 3rd per. sing., neut. g., poss. c., gov'd.
by *gods*.

Gods : com. n., 3rd per. plu., com. g., obj. c., gov'd. by
prep. *of*.

Spreading : Part. adj., qual. n. *oak*.

Sat : Irreg. intrans. verb, indic. mood, past tense, sing.,
3rd per., to agree with subject *Druid*.

Chief : Com. n., masc. g., sing., 3rd per., nom. c., in app.
with *Druid*.

Spoke : Irreg. trans. verb, act. v., indic. mood, past
tense, sing., 3rd per., to agree with subject *he*.

III. Association.

Rules of syntax and etymology as brought into the "procedure" column.

IV. Recapitulation.

Questions on what has been gone through, and the same bit to be written by the pupils without further help.

PROCEDURE.

I. Read the verse to be analysed. Before beginning to analyse it with class question as to what is a sentence. What parts are necessary to every sentence? Of what must predicate consist? What is a finite verb? Which words are finite verbs in the extract? Underline them. How many sentences therefore shall we have? How is the subject found? Now collect round each predicate the sentence which belongs to it. Is "bleeding" a finite verb? Why not? How much is the first sentence? (The first four lines.) What is the predicate here? About whom are we speaking? What then do we call the words "The queen"? (Subject.) What are we told about the kind of queen? What place is for words qualifying the subject? How much of sentence is the enlargement of the subject? Is the predicate transitive or intransitive? If transitive, what completion must it have? Where is the object direct here? Is there any further completion required in the case of "seeking" here? What name is given to the gods of whom she seeks? To what does the phrase "with an indignant mien" refer? Where shall we put it in then? Work out the other sentences in the same way, and let class write out the whole for home-work, or let them write one or two sentences at once in class.

Parsing: Underline some of the more difficult words in the passage for parsing. Ask pupils to parse them orally, and question as to the *function* of each word, in order to find the part of speech it belongs to. Ask the reason for each case given to the nouns. Lead class to distinguish between the verbal forms in "ing," and discriminate when it is a participle, when an adjective, when a noun—giving examples.

In parsing *chief* teach the rule for nouns in apposition, and draw from class why they should agree in case, and ask for other examples of the same.

NOTES OF A LESSON ON TRANSITIVE AND INTRANSITIVE VERBS.

Class—Average age, 12 years. *Time*—Half an hour. *Aim*—To exercise pupils' understanding and teach them to generalise in English grammar.

MATTER.

I. Preparation.

1. Examples drawn from class.
2. Definition of sentence.
3. Two principal parts $\left\{ \begin{array}{l} \text{subject} \\ \text{predicate} \end{array} \right\}$ meaning or.

II. Presentation.

1. Examine examples given and deduce :
 - (a) Some verbs are complete in themselves. Others require a noun or its equivalent after them.
 - (b) Latter express action *passing over* from subject to an object. Former a state of being, or an action *not* passing over to an object.
2. Two kinds of verbs $\left\{ \begin{array}{l} \text{Transitive (Lat. } transire = \text{to pass} \\ \text{over).} \\ \text{Intransitive (Lat. } in = \text{not).} \end{array} \right.$

III. Association.

Give short sentences, *e.g.*, "He ran," "She broke her doll," "The boy reads well," etc. Get class to distinguish kind of verb, and give reason in each case.

IV. Recapitulation.

Definitions of transitive and intransitive verbs.

V. Application.

Get class to make six sentences with transitive and six with intransitive verbs.

PROCEDURE.

I. Introduce lesson by asking for sentences from the class. Write four or five on the blackboard, choosing some

with objects and some without. Ask what two parts are common to all, and what each denotes.

II. In what do the sentences differ?

Taking an example containing an *intransitive* verb, ask if sense is complete with subject and predicate alone. Take a transitive verb in same way, underline verb in each case, and write complete or incomplete, as case may be, after it. So with all the examples. Ask why some—*e.g.*, “The child *sees* a hare”—are incomplete. Elicit that one cannot *see* without seeing something, therefore the verb requires something, *i.e.*, a noun or its equivalent to complete its meaning. Ask for other examples of verbs incomplete without something after them. What do they express in every case? (Action.) Give two examples, such as “The boy runs” and “The boy struck his brother”. Deduce that both express actions, the difference being that one remains with the doer, the other passes to an object.

Give derivation, and draw from class the definition of transitive and intransitive verbs.

III. Next, go round class with examples, and ask what the verb expresses in each case, and to which class it belongs, and if transitive, where is the object.

IV. Briefly recapitulate by asking definition and derivation of transitive and intransitive verbs.

V. Conclude lesson by application, as in matter.

LESSON ON THE VOICE OF VERBS (ENGLISH GRAMMAR).

Class—Oxford Preliminary Grade. *Time*—Half an hour. *Aim*—To exercise the pupils’ reasoning powers and lead them to discriminate between active and passive voice.

MATTER.

I. Preparation.

Refer to kind of verbs $\left\{ \begin{array}{l} 1. \text{ Transitive.} \\ 2. \text{ Intransitive.} \end{array} \right.$

Draw from class examples of 1.

II. Presentation.

Put examples on blackboard, or such as :

1. The boy received a bicycle.

2. The child loves its parents.
 3. She gave the book to the mistress.
 - (a) A bicycle was received by the boy.
 - (b) The parents are loved by the child.
 - (c) The book was given by her to the mistress.
- Compare by analysis 1 and (a), 2 and (b), 3 and (c).

Contrast :

1. The position of boy, child, and she in each case.
2. The form of the predicate in each case.
3. What the subject denotes in each case.
4. What becomes of the former subject in (a), (b) and (c).

Deduce :

1. { In 1, 2, 3 "The subject denotes the *doer* of the action".
1. { In (a), (b), (c) "The subject denotes the *sufferer* of the action".

2. { (a) Corresponding to these two cases the *verb* has two distinct *forms* to denote the above.
2. { (b) In the second case it consists of the *verb to be* plus *past participle*. To these changes in form of the verb the name *voice* is given.

3. { *Definition of voice* : The change in the form of the verb to show whether the subject denotes the *doer* or the *sufferer* of the action.

Two forms { *Active* : Subject denotes the *doer*.
 { *Passive* : Subject denotes the *sufferer*.

Cf. derivation *actum* = done, *passum* = suffered.

4. How the passive is formed.

III. Association.

Use of analysis throughout lesson.

IV. Application.

Exercise pupils :

1. In changing sentences from active to passive and *vice versâ*.
2. In telling the voice of miscellaneous examples, in each case giving the reason.

V. Recapitulation

Of definitions of (1) voice, (2) active, (3) passive, etc.

PROCEDURE.

I., II. and III. Begin lesson by asking the meaning of transitive and intransitive verbs, and drawing examples of each from class. Our lesson has to deal with *transitive* verbs only. Put three examples of pupils' own making on blackboard; ask where is the subject, predicate and object in each, and what the subject denotes. Underneath each example write the same idea in the passive voice, and let class analyse each. Compare the subject in each case, and the object. What does the subject denote? What the object? What else has changed in the sentence? When does the change in the predicate take place? Of what does it consist in the second case? We find, then, the verb has two forms corresponding to the function of the subject, and to these the name "voice" is given. Now give another example, *e.g.*, "The king governs England". Question as to meaning of subject and object. What connection they have with the action of governing. Let class change the sentence, making the assertion about England. What follows? What does the subject now denote? Give names *active* and *passive* connecting them with their derivations. Give some examples of verbs, *e.g.*, "was killed," "learns," "had written," "was loved," and draw from class whether subject denotes doer or sufferer of the action in each case, which voice it is, and why. Call attention to *voice* belonging to the *verb*, not subject, and elicit definition from class. Lastly, examine forms of passive voice in sentences on blackboard, and deduce the general rule of how it is formed, verb *to be* plus past participle. Give one or two examples of progressive active to guard against mistaking it. Contrast the subjects in each case. Also ask class why we took no account of intransitive verbs in this case.

IV. Conclude lesson by letting class apply their knowledge by exercises in the application.

V. *Recapitulation*: What is voice? How many forms are there, and what does each denote? What changes take place in making a sentence active that was passive? etc.

LESSON ON THE FUNCTION OF CERTAIN WORDS.

Class—Oxford Preliminary Grade ; average age, 12. *Time*—Half an hour. *Aim*—To exercise reasoning powers of the class and lead them to discriminate between the different functions of words.

MATTER.

I. Preparation.

1. Meaning of "parts of speech".
2. Words are classed according to their *function* in a sentence.
3. Give examples, *e.g.*, *that*, *back*, *round*, *well*, *but*, and show that they cannot always be classed if they stand alone, but must be read in a sentence.

II. Presentation.

- | | | |
|---------------|---|--|
| <i>That.</i> | { | <p>(a) <i>That</i> book is mine (dist. adj., points out a noun).</p> <p>(b) You may have the book <i>that</i> is here (rel. pron., stands for book and joins sentence).</p> <p>(c) He said <i>that</i> you took it (conj., joins sentence).</p> <p>(d) <i>That</i> is not so (adj., used as a noun).</p> |
| <i>Back.</i> | { | <p>(a) His <i>back</i> was turned (noun).</p> <p>(b) He took the <i>back</i> seat (adj.).</p> <p>(c) They <i>back</i> the winner (verb).</p> <p>(d) They turned <i>back</i> (adverb).</p> |
| <i>Round.</i> | { | <p>(a) Take one <i>round</i> more (noun).</p> <p>(b) A <i>round</i> table is useful (adj.).</p> <p>(c) They <i>round</i> the cape (verb).</p> <p>(d) They went <i>round</i> (adv.).</p> <p>(e) They went <i>round</i> the house (prep.).</p> |
| <i>Well.</i> | { | <p>(a) The child is <i>well</i> (adj., only used in predicate).</p> <p>(b) He knows <i>well</i> (adv.).</p> <p>(c) Leave <i>well</i> alone (noun).</p> <p>(d) <i>Well</i>, how did you know it? (interjection).</p> |
| <i>But.</i> | { | <p>(a) You study, <i>but</i> do not always succeed (conj.).</p> <p>(b) Who can it be <i>but</i> him (prep.) = except.</p> <p>(c) There was <i>but</i> one thing to do (adv.) = only.</p> <p>(d) He began with a "<i>but</i>" (noun).</p> |

III. Association.

In above examples associate the classification of the word in each case with its function. Refer to definitions of different parts of speech.

IV. Application.

1. Ask pupils to classify words in examples such as:
 - (a) "She said *that*, *that* that, that he used was incorrect."
 - (b) "They sang a *round* as they ran *round* the round table which others watched *round*."
2. Give other words as "front," "after," "even," etc., and ask pupils to give examples showing them as different parts of speech.

V. Recapitulation

Of matter of lesson by questions.

PROCEDURE.

I., II. and III. Question class as to what we mean when we say "What part of speech is such a word?" or that it is an adjective, or a verb, etc. Show by examples that we cannot always tell the function of a word taken by itself apart from its sentence. For instance, *round*, *back*, etc. Put these on blackboard, and ask what class they belong to. Ask for or supply different examples of *that*, and question in each case as to what office it fulfils, *e.g.*, in (a) it points out the word "book". What qualifies or limits a noun? What is *that* in this case then? In (b) what does *that* do? What could we put in its place? What part of speech is it then? What else does it do besides taking the place of the noun? Can we ever use *that* to join sentences only? Give examples (c). Lastly, give the fourth example, and ask what is its function here. Then recapitulate the four parts of speech *that* can be, and elicit other examples of each from the class.

IV. Treat the other words in a similar manner, and after going through all the words in the matter, write the sentences

given in Part IV. (*Application*) on the blackboard, and let the class write to what part of speech each of the words in italics belongs; then correct aloud, making the pupils give reasons in each case.

V. *Recapitulation questions* :

What must we know about a word before being able to classify it?

What parts of speech can *that* be? Also *well*, *back* and *but*.

Give examples of *well*, *back* and *but* used as nouns.

What are the following words in italics? Why are they so classed?

Front seat. The *front* of the house. In *after* years. *After* you. *Afterwards*.

NOTES OF LESSON ON ELEMENTS OF ENGLISH LANGUAGE.

Class—Oxford Seniors; age, 15 to 17. *Time*—Fifty minutes. *Illustrations*—Use map of Europe for I., and put chart on blackboard. *Aim*—To increase knowledge of historical grammar; to lead class to connect historical events and growth of language.

MATTER.

I. Preparation.

1. Who the English were, and whence they came.
2. Who were their predecessors, and whither they were driven.
 - (a) *Erse* or *Iberians*, to Ireland and Scotch Highlands.
 - (b) *Britons*, to Wales and Cornwall.
3. English nation was the only conquered nation that preserved its own tongue.
4. Story of creation of the English language.

II. Presentation.

1. *Source*. Teutonic branch of Aryan language.
Low German dialect akin to Dutch, Flemish, Danish, Icelandic.

2. *Foreign Elements.* *Ele-* { (a) Keltic.
 (b) Scandinavian.
 (c) Latin (Norman French).
 (d) Greek and Hebrew.
 (e) Almost all modern languages.

3. *Periods of influx of above additions :*

- (a) *Keltic.* { i. Words direct from ancient Britons. { *Rivers* : Avon, Ouse.
 { *Mountains* : Pen, Ben.
 ii. Words lately introduced through modern authors, chiefly Sir Walter Scott. { clan, plaid, pibroch, slogan, etc.
- (b) *Scandinavian.* { Through Danish Invasion and Settlement. { Names of towns in "by," 600 in East of England alone; *also* fell, firth, thorpe, village, kirk, dairy, plough.
- (c) *Latin.* { i. *Early Latin.* { (1) *Roman occupation*, B.C. 43 to A.D. 410 : { street, colony, -caster.
 { (2) *Conversion to Christianity*, A.D. 596 : words relating to church : { altar, chalice, creed.
 ii. *Norman French*, 1066. { (1) Who the Normans were, and what was their influence on Latin.
 { (2) Feudalism. { *Feudalism* : Chivalry, joust, lance, vassal.
 { *Chase* : Brace, forest, venison.
 { *Law* : Assize, attorney, chancellor.
 (3) Largest influx took place at this period.
 iii. *Later Latin.* { (1) Through Renaissance : fall of Constantinople, 1453; *words* chiefly classical.
 { (2) Contrast pure Latin form with the mutilated form of Norman influence.

- (d) *Greek.* { i. Through Latin with Christianity : Deacon, anthem, martyr.
ii. Through classics and science : Thermometer, telephone.
- (e) *Other Modern Languages.* { *German* : Meerschaum, poodle, Dutch.
Italian and Spanish : In music, etc.
American : Wigwam, squaw, cannibal, tobacco.
African : Gypsy, canary, morocco.
Indian : Rajah, ayah, etc.
Russian : Knout, drosky, Czar.

III. Association.

1. Connect words derived from other languages with our relations with different nations.
2. Show how we in a similar way influence the language of other countries.

IV. Recapitulation.

1. Summary of chief elements of English language.
2. Examples of each.

V. Application.

Classify the following according to their origin : Boy, steppe, phonograph, canon, volcano, canoe, Whitby, amateur, shillelagh, wall, vizor.

BLACKBOARD DIAGRAM.

Elements of English Language.

English.	
Latin (including Norman French).	
Greek.	Italian, Spanish, American, Russian, Hebrew, Indian, etc.

PROCEDURE.

I. Introduce lesson by questioning on the ancient inhabitants of Britain and their successive conquerors; thus explain the difference of language of the Scotch, Welsh, Irish. Refer briefly to the invasion of the Romans, Picts and Scots, Angles and Saxons, Danes and Normans. Draw from class that our present tongue must be a great mixture, made up largely from those of the above-named nations and other contributions, and tell the little legend about the English being forgotten at Babel.

II. Tell the class *source* (1) of our language, and its indirect connection with all the other European tongues through the *Aryan* family (Lapps and Finns excepted). Draw from class foreign elements by referring to history, and write (2) on blackboard. Now we shall consider each in particular, and see how and when it influenced our language.

(a) *Keltic*: The language of the ancient Britons. Where were they driven? Very few words of their language survived. What names were most likely to remain after them? Elicit words expressing physical features, *e.g.*, rivers—Ax, Usk, etc.; mountains—Pen, Ben. Again, in modern times many Irish and Scotch words have crept in through popular authors who chose subjects relating to these nations. Draw from class such authors, and elicit the words in matter by giving their meaning.

(b) When did English proper begin to be spoken? By whom? Who were the next invaders of the land? (Danes.) Where did they settle? Whence did they come originally? Becoming settlers in the land, how did they influence the language principally? Refer to their agricultural tastes: such words as *dairy*, *plough*. Also give terminations “by,” “thorpe,” and ask examples of names of places. Where are all such names found? Why in East of England?

(c) We now come to by far the largest element in the language, *i.e.*, the Latin element. Its influx may be divided into three periods, according to the time of the different

additions made. The character of words introduced depended much on the cause of introduction. By questioning in history draw from class the words of the i. Early Latin Period, both from Roman occupation and introduction of Christianity. Ask where Christianity came from originally, and show that many of these ecclesiastical words were of Greek and Hebrew origin. ii. In a similar manner elicit the Norman French Period. Ask how it comes under the head Latin. How words thus introduced are likely to differ from classical Latin. Why was the Norman French influence so much greater than that of previous foreign elements? Refer to the struggle between French and Anglo-Saxon or old English for the mastery for two centuries, the one spoken at Court, the other by the conquered serfs. Compare German and English of the present day to show the work done during those centuries. Ask class for some examples of words relating to feudalism, chase and law. Why are they Norman French? iii. For the next Latin Period refer to 1453. Fall of Constantinople, and the results on the learning of the age. Ask in what the Latin and Greek words now introduced differed from the earlier additions. How account for this?

(d) *Greek*: Besides words introduced through Latin with Christianity and those of the Renaissance, there is a steady influx to meet the needs of the science of the present day. Ask for examples of words for modern inventions. Why is Greek chosen for coining these new words?

(e) Finally, refer to acquisitions which must come from intercourse, commercial or otherwise, with other nations, and draw from class examples of these, some such as in Matter V. Point out that we give as well as take in this way, *e.g.*, *French*: nous five-o'clockerons, high-life (hig-lif), bifteck, tennis, cricket, etc.

Recapitulation: The English language has for its basis the Anglo-Saxon and Low German dialect of the Teutonic branch of the Aryan family. Its vocabulary consists mostly of Latin words, however, introduced chiefly at three different periods. (Ask time and character of each.) It also contains

contributions from Greek (when and how), Keltic (ditto), Danish, and nearly all modern languages. (A few examples.)

Conclude lesson by drawing diagram, and asking the words given in the *Application*.

NOTES OF A LESSON ON SYNONYMS.

Class—Age, 16 to 17 years. *Time*—Three-quarters of an hour.
Aim—To increase knowledge of historical grammar, and to lead class to connect historical events and growth of language.

MATTER.

I. Preparation.

1. Nominal definition of term. { *Syn* = with, *onoma* = a name—a name or word having the same meaning with another.
2. Real definition. { Terms of like significance in the main with slight differences established.
3. Why there are comparatively few true synonyms. { (a) Exact meaning not generally apprehended: hence looseness of use of words.
(b) Shades of meaning arise from this cause, and usage gives one to one word and a different one to its synonym.
4. Why English has many apparent synonyms. { (c) Differences of etymology.
(a) Vocabulary mainly derived from two sources—Latin and English.
(b) Two forms of { i. Norman French.
Latin element. { ii. Classic.

II. Presentation.

1. Examples of:

	<i>English.</i>	<i>Norman French.</i>
(a) True synonyms.	Begin	Commence.
	Will	Testament.
	Buy	Purchase.
	Hearty	Cordial.
	Wish	Desire.

	<i>English.</i>	<i>Norman French.</i>
(b) Different shades of meaning.	Limb	Member (of society).
	Luck	Fortune (riches).
	Work	Labour (hard work).
	Bough	Branch (of sea, etc.).

2. *Cause* : Norman and Saxon intercourse.

	<i>Later Latin.</i>	<i>(Derivation.)</i>	<i>Norman Fr.</i>
3. Examples of Latin doublets (apparent synonyms), same words in different forms.	Benediction	(Benedictionem)	Benison.
	Pauper	(Pauperem)	Poor.
	Example	(Exemplum)	Sample.
	Fragile	(Fragilem)	Frail.
	Separate	(Separatum)	Sever.

4. How shorter forms of Norman French are accounted for.	Spoken language tends to shorten words.		
	Words introduced through writing keep their full form.		

5. Greek doublets (apparent synonyms), different shades of meaning.	<i>Through Normans.</i>	<i>(Gr. Der.)</i>	<i>Later Forms.</i>
	Fancy	(Phantasia)	Phantasy.
	Palsy	(Paralysis)	Paralysis.
	Slander	(Scandalon)	Scandal.

III. Association.

1. Connect change of meaning with cause where possible.
2. Show how for better mutual understanding *yokes of words* came to be used ; *e.g.*—
 Acknowledge and confess.
 Aid and abet.
 Mirth and jollity.

IV. Recapitulation.

- As to :
1. Meaning and kinds of synonyms.
 2. Difference between doublets and synonyms.
 3. How former came to exist.
 4. Examples of all.

V. Application.

Class to supply synonyms in a passage set.

Blackboard Sketch.

1. Definition.
2. Causes of shades of meaning. $\left\{ \begin{array}{l} (a) \text{ Usage.} \\ (b) \text{ Etymology.} \end{array} \right.$
3. Norman French influence.
4. Doublets. $\left\{ \begin{array}{l} \text{Latin.} \\ \text{Greek.} \end{array} \right.$

PROCEDURE.

I. Begin lesson by giving derivation of words, and asking the meaning. Draw distinction between nominal and real definitions of them; according to the former the words should agree exactly, but according to the latter there are essential resemblances but partial differences of meaning, *e.g.*, shepherd and pastor. Ask for some other examples of synonyms, suggesting such words as forgive, limb, buy, work, sympathy, etc. Ask how the shades of difference in meaning can be explained (1) by custom and looseness of ordinary speech, (2) by etymology.

Examples of:

1. Famine and hunger, ghost and spirit.
2. Felicitate and congratulate.

Criticise etymological distinctions between following by examining derivations of each:

1. $\left\{ \begin{array}{l} \text{Arrogant (*ad rogo*)}, \text{homage demanded as due.} \\ \text{Presumptuous (*prae sumo*)}, \text{homage taken before due.} \end{array} \right.$
 2. $\left\{ \begin{array}{l} \text{Felicitate, to wish happiness to.} \\ \text{Congratulate, to rejoice with another.} \end{array} \right.$
 3. $\left\{ \begin{array}{l} \text{Invent (*in venio*)}, \text{to make what did not exist before.} \\ \text{Discover, to show that which existed.} \end{array} \right.$
- $\left\{ \begin{array}{l} \text{Desert.} \\ \text{Abdicate.} \end{array} \right\}$ Refer to James II. and Commons, as in Trench.

II. Refer to former lesson on sources of our vocabulary, and ask whether English is likely to have many or few synonyms, and why. Show that in many cases the Norman French superseded the English, and *vice versâ*; but that the two have been retained in many instances, though the tendency

to discriminate between the uses of the two leads to our having few perfect synonyms. Ask class for the synonyms of *wretched*, *cordial*, *testament*. (Refer to technical or law language, "This is the last will and testament of . . .". Draw from class reason for having two words.) Next lead class to examine how others have slightly differed in meaning through constant usage, *e.g.*, shepherd, love, kingdom, freedom, luck, deed, bough, etc.; *also*, fancy and imagination, fanaticism and enthusiasm, feminine and effeminate, famine and hunger.

III. Refer again to Latin element in English; ask the different periods at which the influxes took place, and what differences would naturally be seen between the words introduced through the French and those of the later classical period. Show that some words introduced by the Normans were reintroduced in a more classical form at the Renaissance. (Give Norman French, and draw second form from class in some cases, and in others give Latin derivation, and elicit both.) Call attention to the change in the word itself, and to the change in meaning.

Treat Greek doublets in same way.

Next show that, owing to the various sources of our vocabulary, we have even some triplets, *viz.*, English, Latin and Greek or Norman French.

Give English, and let class discover the other synonyms.

<i>English.</i>	<i>Latin.</i>	<i>Greek.</i>	<i>N. F.</i>
Fellow-feeling.	Compassion.	Sympathy.	
Kingly.	Regal.		Royal.

Explain differences in form causing doublets, by the contractions used in daily speech, varieties of pronunciation, etc.

IV. Recapitulate briefly as to meaning of synonyms; their use. Why England has so many. How doublets came into the language. What is the tendency of the language as to the use of synonyms.

Conclude lesson by reading the passage from *Ivanhoe* which brings out the Norman French influence in the forma-

tion of synonyms, and show the meanings naturally differed from the very circumstances of the case, and question class as to its application.

LESSON ON THE CHANGE OF MEANING OF WORDS.

Class—Oxford Junior Grade. *Time*—Three-quarters of an hour.

Aim—To exercise judgment of the class and interest them in discovering the laws which govern the change of meaning of words.

MATTER.

I. Preparation.

Causes of Changes. { 1. Passage from one language to another.
2. Passage from one age to another.

II. Presentation.

Laws of Changes. { 1. *Change of Association* : Plum, prune, raisin, heathen, pagan, gossip.
2. *Law of Contraction* : As the number of words increase the province of each diminishes (especially measurement), foot, stone, acre, furlong, perch (poke, a bag), bushel (little box), chant, preach, speculation, extravagant, censure.
3. *Law of Metaphor* : When foreign words are side by side with native in meaning, as *videre* = to see, the latter retain *ordinary* meaning, and the former—
(a) Abstract or philosophical term—vision.
(b) Extraordinary sense — vision, provident.
4. *Law of Extension* : Wider meaning, especially as regards war and law,

Laws of Changes.

- e.g., influence, formerly a term in astrology, triumph, privilege (law for individual), legion, character, paper.
5. *Law of Deterioration* : Caused by a difference in the moral sense—cunning, craft, impertinent (not to the point), officious (exact in performance of duty), villain, knave.
6. *Law of Amelioration* : Improved in meaning, as humility, fond, minister, servant, Whig and Tory, Christian, generous, gentle (noble birth).

III. Association.

Compare with changes of manners and customs, which are results of changes of thought, in :

1. Education.
2. Living, furniture, dress and fashion.
3. War.

IV. Application.

Words changed in meaning illustrated from *As You Like It* : Conceit, amaze, taxation, character.

V. Recapitulation.

1. Causes of change. { Passage from one language to another,
from one age to another.
2. Laws of change. { Examples : Association, contraction,
metaphor, extension, deterioration,
amelioration.

PROCEDURE.

I. Give some examples to pupils, such as chant, preach, raisin, beef—words derived from other languages, and in the passage have lost meaning in the original language, and thus have a slightly different meaning in English. Also give examples like villain, conceit, amaze, censure, knave, as examples of change occurring in passage from one age to another. The words that change in meaning are many and

various, and cannot be classified exactly, but only in a very general way.

II. 1. There are six laws (general) which have governed the alteration in meaning of many of our words. Here give examples, such as plum, prune, raisin, heathen, pagan, gossip, clumsy, disaster, gazette, and from the derivation of each deduce law of change by association, *e.g.*, *raisin* = grape in French, to us = dried grapes, as this is the particular association we give to grapes from France; *heathen* = living on a heath, and as the religion of such was non-Christian, we associated this fact with the dwelling-place, and hence *heathen* means pagan.

2. Give examples, as foot, acre, furlong, peck, bushel, chant, preach, etc., and from derivation elicit that meaning has contracted, as chant, from *cantare* = to sing, but to us applied to a particular kind of singing.

3. Give examples, as *vision*, from *visum* = seen, used side by side with see and sight, but in altered sense; also, *palliate* = to throw a cloak over, transferred to lessen, find excuse for. *Trivial* = where three roads meet, means common or unimportant.

4. Give examples of *influence*, *triumph*, *privilege* = law for individual, and now any special favour granted; *legion*, *character*, *paper*, *boor* (boer = a Dutch farmer); *explosion* = hissing off the stage; *harbinger* = prepare harbour or lodging. What can we remark about these changes? Has the meaning contracted? Compare with Law 3.

5. Give examples, as *villain*, *knave*, *impertinent*, *cunning* = obsolete, pres. participle of verb *can*; *censure*, *churl* = country man—now disobliging person; *officious*, *insolent* = unusual—now rude; *conceit* = thought: what is cause due to here? The idea conveyed by word has altered in its moral sense. What is the reason of this?

6. In an opposite way words have risen and improved in meaning. Ask original meaning of *humility*, *fond*, *minister*, *Whig* and *Tory*, *generous*, *gentle*, *companion*, *shrewd* = wicked—now means clever. These words fall under law of "Amelioration",

Summary : Words change their meaning by passing from one language to another, and by passing from one age to another, therefore we cannot tell the acknowledged meaning by derivation always. Six laws govern these changes—the Laws of *Association*, *Metaphor*, *Contraction*, *Extension*, *Deterioration* and *Amelioration*.

Recapitulation : What do I mean by the law of contraction? Give examples. The law of association? Give examples. Which law is exemplified in the words: compassion, church, minister, disease, trivial, fond, impertinent, privilege, palliate, villain, speculation.

NOTES OF A LESSON ON THE TRANSLATION OF A SELECTED PASSAGE FROM FRENCH.

Class—Average age, 15. *Time*—Forty minutes. *Aim*—To lead class to note difference between English and French modes of expression, and to express following passage in good English.

MATTER.

I. Preparation.

1. Class will read passage through to get a general knowledge of its meaning, which they will give in their own words.

II. Presentation.

On dit que Sir Isaac Newton était d'une humeur égale et douce, qu'aucun accident ne pouvait le troubler ; *on raconte* à ce sujet l'anecdote remarquable que voici : Sir Isaac, avait un *petit* chien favori qui s'appelait Diamant. Un soir qu'il avait dû passer dans une chambre à côté, Diamant resta seul. A son retour, Sir Isaac, qui n'avait été absent que quelques minutes, eut le chagrin de voir que Diamant, en *renversant* une bougie, avait *mis* le feu à des papiers qui contenaient le travail à peu près achevé de plusieurs

années. Ses papiers s'étaient enflammés et avaient été presque entièrement mis en cendres. Cette perte considérant l'âge avancé de Newton, était irréparable; mais, sans punir le chien: "Ah! Diamant," s'écria-t-il, "tu ne sais pas quel mal tu *viens de* faire."

Words in italics to be commented on.

III. Association.

1. *On dit* may be translated by "it is said" or "they say". This construction is one way of avoiding passive voice, which is less frequently used in French than in English. Example: "On vous demande," "you are wanted"; "on m'a dit," "I was told"; "on l'a renvoyé," "he was dismissed".
2. *Qui s'appelait*: Another way of rendering the passive. Translate by "who was called" or "whose name was". Other examples are: "Cela se mange vert," "that is eaten green"; "Les portes s'ouvraient," "the doors were opened".
3. *Anecdote remarquable*: Usual position of adjective is after the noun, adjectives of colour always; *e.g.*, chapeau blanc, robe noire, etc. Some adjectives precede the noun, especially those of one syllable; *e.g.*, beau, bon, digne, etc., "un beau cheval".
4. *Petit chien favori*: When two adjectives accompany a noun one precedes and the other follows, "une belle rose blanche," "une petite fille intelligente".
5. *Mis le feu*: Different meanings of *mettre*—
 - (a) To put on, "mettre son chapeau".
 - (b) To begin, "elle se mit à pleurer".
 - (c) "Être mis," "to be dressed," "une personne bien mise".
6. *Années* instead of *ans* when used with an adjective to denote the whole duration, "toute l'année".
7. *Renversant*, pres. part. after prep. *en*; all other prepositions require infinitive—"de venir," "pour faire," etc.
8. *Viens de faire*: "Venir de," followed by an infinitive = "to have just . . .". Other examples.

IV. Recapitulation.

Passage will be translated through quickly by a member of the class.

V. Application.

Class will answer questions in French on the subject-matter as in procedure, or similarly.

PROCEDURE.

I. Begin lesson by letting a pupil read through passage aloud for the class, and then give in a few words its general meaning.

II. Then take each sentence, and let member of the class give its exact meaning, and then polish each one until it reads quite smoothly.

III. Then take each of the passages in italics in matter, and deal with them somewhat after following manner:—

1. *On dit, on raconte* : Ask some one to translate again, and point out difference between the English and French usages. Let class supply other examples.

2. *Qui s'appelait* : Ask a member of the class to translate this. Show how this form is often used to avoid the passive voice, which is less frequent in French than in English. Let class supply more examples, and then ask them to translate such sentences as "What is his name?" "His name is Charles," etc. Give class more examples as in matter.

3. Anecdote *remarquable, petit chien favori* : Let class point out how the French differs from English with regard to position of adjectives. In English they are placed after the noun sometimes for effect, in French they are sometimes placed before for the same reason.

4. Get more examples from class. Give class some examples of a noun qualified by two adjectives, and then let them supply others, some of which may be written on board. Let class point out how the French usage differs from English, *viz.*, in placing one adjective before and the other

after. There are, however, exceptions to this rule, especially if the adjectives are of one syllable—*Une bonne petite fille*.

5. *Mis le feu*: Give some examples to class, such as *J'ai mis mon chapeau*; *elle se mit à pleurer*; *voilà une personne bien mise*, and let them say what different meanings *mettre* may have.

6. *Années*: Give a few examples, using the words *ans* and *années*. *Il a été là il y a trois ans*. *Nous avons eu une très bonne année*. Let class point out difference in use. *Année* generally used instead of *ans* when accompanied with an adjective to denote the whole duration of time.

7. *Renversant*: What part of verb is this? What precedes it? What part of speech is *en* in this case? Let them supply other examples of the same kind. Then give examples of other prepositions, and let class point out how the construction differs. Example: *J'ai besoin d'une plume pour écrire*. *J'ai envie d'écrire maintenant*. *Il commence à pleuvoir*, etc. *En* is the only preposition which is followed by present participle.

8. *Viens de faire*: Ask class to translate again, and show that *venir de* followed by an infinitive means "to have just"; while *venir à* means "to happen". Get several other examples from class.

IV. Let a member of the class translate passage through again quickly.

V. Class will now close books and answer questions set to them.

Que savez-vous de l'humeur de Sir Isaac Newton? *Était ce facile de le troubler*? *Aimait-il les animaux*? *Qu'est ce qui vous fait penser ça*? *Comment s'appelait-il ce petit chien*? *Qu'a-t-il fait un jour étant seul dans la chambre*? *Comment se fit-il que Diamant restât seul*? *Que vit Sir Isaac à son retour*? *Se fâcha-t-il*? *Que dit-il*?

NOTES OF A LESSON ON THE FORMATION OF THE PLURAL OF FRENCH NOUNS.

Class—Average age, 14. *Time*—Half hour. *Aim*—To point out to class the reason for the various irregularities in the plural of nouns.

MATTER.

I. Preparation.

Refer to the modern formation of plural of the nouns in English. This formation came from the Norman French as one of the results of the Conquest.

II. and III. Presentation and Association.

- | | | |
|---|---|---|
| General Rule. | { | Add <i>s</i> to the singular. Ex.: le jardin, les jardins. |
| Reason for <i>s</i> rather than any other letter. | | French language borrowed from the Latin accusative both its singular and its plural: the letter <i>s</i> was generally the sign of the accusative plural in Latin. Ex.: <i>rosas</i> = roses; <i>homines</i> = hommes; <i>sonos</i> = sons; <i>planities</i> = plaines. |
| Certain endings we must look to in considering plural of nouns. | { | (a) <i>s, x, z</i> : fils, voix, nez.
(b) <i>au, ou, eu</i> : chapeau, clou, neveu.
(c) <i>al, ail</i> : cheval, gouvernail. |
| | | If not ending in one of these ways we know that the plural is formed by adding <i>s</i> . |
| (1) Nouns ending in <i>s, x, z</i> . | { | Remain same in plural.
La voix, les voix. Le lis, les lis. Le nez, les nez, etc. |
| (2) Nouns ending in <i>au, eu</i> . | | Take <i>x</i> in plural.
Le chapeau, les chapeaux.
Le neveu, les neveux. |
| | | One ex. to each. { landau(s)
bleu (s). |

IV. Recapitulation.

Question on the foregoing rules.

V. Application.

Get from class a number of examples with their plurals.

BLACKBOARD SKETCH.

Formation of plural of French nouns.

1. General Rule. { Add *s* to sing., therefore the sign of Lat. acc. pl. }
2. Endings to be looked to. {
 - (a) *s, x, z* remain same in plural.
 - (b) *au, ou, eu.* {
 - au, eu* take *x*, except *lan-dau* and *bleu*.
 - ou* takes *s*, except seven: *bijou, caillou, chou, genou, joujou, hibou, pou*, which take *x*.
 - (c) *al, ail.* {
 - al* change into *aux*, except *bal*, etc.
 - ail* follow general rule, except seven: *bail*, etc.
- 3 Nouns with *ir-* }
regular plural. } *aïeul, ciel, travail, œil.*

PROCEDURE.

I. Introduce lesson by questioning class on modern formation of plural of English nouns. Whence do we get this plural? When did French begin to influence the English language? The French language then must have formed its plural in same way. Hence general rule is to add *s* to sing.

Then get a few examples from class, and ask meaning of "general rule".

II. and III. Now there is a reason for the choice of *s* rather than any other letter.

From what language is French derived? Tell class that majority of French nouns are formed from Latin *accusatives*, not *nominatives*. Get some examples from class as in matter, and let them say that *s* is present in all the declen-

sions in the accusative plural. Hence the *s* in French in accordance with etymology.

The first thing we are to look to when asked to form plural of a French noun is the termination, because the plural depends upon this. Ask various examples from class, and supply any endings which class fails to give, then classify them on blackboard. Three classes:—

(1) Nouns ending in *s, x, z*.

(2) *au, ou, eu*.

(3) *al, ail*.

These are the only three classes of endings we need trouble about. Then consider each in turn.

(1) Write a few examples on board, putting the nouns in the plural. *Ex.*: Cet arbre est couvert de belles noix. Ma sœur m'a donné trois lis. Les grands nez. Let class say these remain same in plural as in singular, and supply other examples of same ending.

(2) Write examples on board, and let class give rule as for (1).

(3) Write examples of nouns in *ou*, choosing also some of the exceptions, *e.g.*, *bijou*, etc. Let class say that some take *s*, others *x* in plural. Then give the seven exceptions. Point out cause for this. In Middle Ages *s, x* and *z* were used indiscriminately—*voiz* or *voix*. This licence has survived in seven words—*bijou*, etc.

The third class of endings, those in *al, ail*. Write examples on board, and let class give rule. Then give the seven exceptions.

Reason for the *aux*. In early French nouns in *al* followed general rule. In the thirteenth century *al* was softened into *au* before a consonant, *e.g.*, *cheveau-léger*. Chevals then became chevaus, and as *x* and *s* were used indiscriminately, it gradually became chevaux. The old plural survived in a few words. Write them on board.

Nouns in *ail*. Write examples on board, and let class supply rule as before.

Then write nouns with irregular plural as in matter, and draw from class that the irregular plural leaves the noun the

same signification as it has in singular, while the regular imparts a peculiar signification.

IV. What is the general rule for forming plural of French nouns? Why *s*? What have we to look to when asked to form plural of a noun? Which endings particularly concern us? How is plural of nouns ending in *s*, *x*, *z* formed? Give example. Plural of nouns ending in *au*, *eu*, *ou*? Which of those in *ou* take *x*? Why? Plural of nouns ending in *al*? Why? Give some exceptions. Nouns in *ail*? Mention some nouns with irregular plurals. What meaning does the regular plural give to the noun? Give an example.

V. Let class write down quickly plural of *chou*, *clou*, *cardinal*, *chapeau*, *landau*, *bleu*, *neveu*, and similar examples.

NOTES OF A FIRST LESSON ON THE RULES FOR THE AGREEMENT OF PAST PARTICIPLES IN FRENCH.

Class—Average age, 14. *Time*—Half an hour. *Aim*—To give class an accurate knowledge of the agreement of past participles.

MATTER.

I. Preparation.

A word of comparison between English and French grammar as to the number of inflexions. In English few inflexions; in French many. Words related to each other must be in agreement. Adjectives must agree with the nouns to which they refer; likewise past participles.

II. Presentation.

- I. Examples: *Des mérites récompensés.*
Des bonheurs passés.
Des lettres bien écrites.
Une personne étonnée.
Un devoir bien fait.

IV. Recapitulation.

Questions on above matter.

V. Application.

Class supply examples, giving reason for agreement or non-agreement of participles.

PROCEDURE.

I. Introduce lesson by comparing the English and French languages with regard to the number of inflexions, and let class point out that the English language has comparatively few, and the French many. Get from class a few examples of agreement in French, *e.g.*, adjectives agreeing with nouns to which they refer.

II. Write Examples 1 on board, and draw from class the function of the participle in each case. That of an adjective, therefore what rule of agreement must it follow? The same as the adjective, *i.e.*, it takes the gender and number of the noun to which it refers. Let class supply other examples, and then write one or two of them on board.

Write Examples 2 on board. Let class point out difference between the use of these participles and those of Examples 1. With what part of the sentence does each agree? Then let class state rule, and supply a few examples: Elle est couchée. La mère est arrivée. Le père est parti. Les enfants sont tombés, etc.

Write Examples 3 (a) on board. Let class point out the different auxiliary, *i.e.*, *avoir*, likewise that the participle does not depend on the subject, since it is invariable in each case, though the subjects are of different genders and numbers. Get other examples of same kind from class.

Write (b) on board, and let class point out difference between these sentences and those in (a). Draw attention to non-agreement of participle. Then let class state rule. Past participle conjugated with *avoir* remains invariable when there is no object, or when the object *follows* the participle.

Write sentences (c) on board. Ask gender and number of participle in each case. Then let class point out in each sentence a word of the same gender and number as participle, excepting, of course, the subject, since participles conjugated with *avoir* do not depend upon the subject. Ask function of this word in sentence, and what position it occupies with regard to participle. Then let class state the rule. Past participle conjugated with *avoir* agrees in gender and number with the direct object when preceded by that object.

Write some examples on board, such as : Avez-vous reçu de ses nouvelles ; Oui j'en ai reçu, and draw from class that it is only with the *direct* object that the participle agrees.

III. Let class supply examples of various kinds, and then analyse participle in each case.

IV. Question in the following or a similar manner : State rule for the agreement of past participles conjugated without an auxiliary. When used in this way to what part of speech is the past participle equivalent ? Give examples. How does the past participle agree when conjugated with auxiliary *être* ? With auxiliary *avoir* ? When does past participle conjugated with *avoir* remain invariable ? etc.

V. Class to take pencil and paper and write down sentences from dictation, applying foregoing rules to participle.

NOTES OF A LESSON ON SELECTED FRENCH IDIOMS.

Class—Average age, 15. *Time*—Half an hour. *Aim*—To teach by comparison the use of French idioms.

MATTER.

I. Preparation.

1. Meaning of an idiom. { Mode of expression peculiar to any language.
2. Why difficult for foreigners. { Because it necessitates an acquaintance with the minds of the people in question.

3. A few examples of English idioms: How do you do?
What is the matter? To carry the day. To owe a
grudge.

II. and III. Presentation and Association.

1. *Il n'y a pas de petit chez soi.*

Meaning of idiom. { There is nothing small in one's own
house; or, People do not find their
house too small. Idea same in both
languages.

English equivalent: There's no place like home.

2. *Chat échaudé craint l'eau froide.* Literally, a scalded
cat fears cold water.

Meaning. { We fear that which has caused us suffer-
ing. Idea is same as in English, but
manner of expressing it in French is
somewhat more forcible.

English equivalent: A burnt child dreads the fire.

3. *Je n'en peux mais.* Literally, I am capable of no
more—*mais* (Lat. *magis*), "more".

Meaning. { I cannot do otherwise. Idea same in
both languages; therefore if one can-
not do otherwise one cannot help
what one is doing.

English equivalent: I cannot help it.

4. *Passer une nuit blanche.* Literally, to pass a white
night.

Meaning. { *Blanche* or *blanc* denotes the absence of
that which one expects to find in the
ordinary course of things, in this case
sleep; therefore *nuit blanche* = a sleep-
less night.

IV. Recapitulation. }
V. Application. } As in procedure.

PROCEDURE.

I. Introduce lesson by asking what is meant by an idiom.
Why are the idioms of any language difficult to foreigners?
Get some examples of idioms in English.

II. and III. Write 1 on board. Draw from class its meaning (literal), and that if people do not find their house too small they are likely to be satisfied, and will not want to change, therefore, No place like home.

Write 2 on board. Class translate literally. Put English of *échaudé* on blackboard. Draw from class the meaning of the idiom. The idea is same in both languages, each denoting a shrinking from something that has caused suffering, therefore, A burnt child dreads the fire.

Write 3 on board. Show connection between *mais* and Latin *magis* = more. Deduce meaning, I cannot do otherwise. Idea same in both languages, I cannot help it.

Write 4 on board. Refer to expression "carte blanche," which means perfect freedom. "Carte blanche" meaning, as it were, a card on which one can fill in anything one chooses. Draw from class meaning of *blanche*, i.e., absence of what one expects to find in the natural course of things. At night one looks for sleep, hence *blanche* = sleepless. Idea here differs from the English.

IV. *Recapitulation* : What is an idiom? What is the equivalent of Il n'y a pas de petit chez soi? What is the meaning of the idiom? What is the equivalent of Je n'en peux mais? From what is *mais* derived. Give the French equivalent of To pass a sleepless night. What is the meaning of *blanche* in the like expressions?

V. *Application* : Class will answer following questions by making use of the proper idiom : Vous avez l'air fatigué qu'avez-vous? N'avez-vous pas bien dormi cette nuit? Passez-vous souvent des nuits blanches? N'osez-vous plus vous promener à cheval? Pourquoi pas? Quelle excuse fait-on lorsque l'on ne veut pas se corriger de quelque faute? Vous êtes donc content de revoir votre pays et d'être de nouveau chez vous?

NOTES OF A LESSON ON REBELLIONS IN THE REIGN OF HENRY VII.

Class—Age, 13 to 15 years. *Time*—Three-quarters of an hour.
Previous Knowledge—General outline of reign of Henry VII. *Aim*—To exercise imagination of the class and lead them to interest themselves in the causes and results of these rebellions.

MATTER.

I. Preparation.

- General Causes.* { 1. Defective title of Henry VII.
 2. Presence of real heir.
 3. Henry's partiality to Lancastrians.

II. Presentation.

1. LAMBERT SIMNEL, 1487.

- (a) *Leader.* { i. Personated Earl of Warwick, son of George of Clarence.
 ii. Joined by Irish and Germans.
 iii. Disproved by exhibition of real heir.
 (b) *Object.* { To oppose Henry and place the Earl of Warwick on the throne.
 (c) *Result.* { i. Defeat at Stoke by Earl of Oxford.
 ii. Simnel captured and placed in king's kitchen.
 iii. Elizabeth crowned to please Yorkists.

2. PERKIN WARBECK, 1495.

- (a) *Leader.* { Personated Richard, Duke of York, supposed to have escaped from the Tower.
 Sought help from Ireland, Scotland, France and Flanders.
 (b) *Object.* { To put Warbeck on the throne.
 Warbeck's failure in Ireland.
 France. *Treaty of Estaples*, 1492.
 Flanders. *Great Intercourse*.
 (c) *Results.* { Insurgents land at Deal.
 Warbeck sails to Ireland and thence to Scotland.

(c) *Results.*

James IV.'s marriage with Cath. Gordon.
 Joined Cornish rebellion, defeated at
 Taunton.
 Warbeck imprisoned in the Tower.
 Attempted escape with Warwick. Executed, 1499.

IV. Recapitulation and Summary.

The causes of the rebellions in this reign were (1) The defective title of Henry VII., (2) Presence of real heir, (3) Partiality to Lancastrians. The first rebellion, headed by Lambert Simnel, who personated the Earl of Warwick, son of Clarence. He was defeated at Stoke by Earl of Oxford, captured and placed in king's kitchen. Second rebellion, headed by Perkin Warbeck, 1495, personated Richard, Duke of York. Sought help of France and Flanders, but was refused. At length went to Scotland, helped by James IV., but thrown off again. Joined the Cornish rebellion, and defeated at Taunton. Imprisoned and executed 1499.

PROCEDURE.

III. Association.

I. Introduce lessons by questions on the descent of Henry VII. What was the last battle of the Wars of the Roses? Give date. Who was crowned on battlefield? Refer to descent of Henry from Henry V.'s widow; also from John of Gaunt. Why was Henry's title weak? What led the people to accept him? In the ordinary course of things who ought to succeed a king? Where were Edward IV.'s sons? Who had the next right? What had become of George Duke of Clarence? His son? Edward Earl of Warwick *was* alive, and Henry, knowing how popular the Yorkists were, had him confined in the Tower. From what we have said, is there any reason why Henry did not feel secure on his throne? (Elicit three reasons.) Did he try to please the Yorkists, and how? What had he to fear? (Cf. other sovereigns in same condition.) What did he do with the real heir? and as result what took place in his reign? (Recapitulate three causes, and write on blackboard.)

II 1. (a) The first rebellion was in favour of Lambert Simnel, who personated the real heir. Who was the real heir? Why was he the real heir? L. S. was really a tool in the hands of Yorkists, because they knew where the real heir was; it was an artifice to test their chances of popularity. In Wars of Roses what people were partial to Yorkists? What Yorkist leader took refuge in Ireland? What would that nation naturally do now? He was also joined by Germans, who, with the Irish and Simnel, sailed to England. Why was it easy to prove that Simnel was not Earl of Warwick? Henry made a point of exhibiting his prisoner in London, so that people might distrust Simnel. Would this news have travelled very quickly to Ireland in those days? and why not?

(b) If Simnel personated the real heir, what must have been his object? Whom were the Yorkists personally against? It had seemed to them that Henry did not even trust his wife Elizabeth ("The White Rose") as befitted her position in giving him a greater right to the throne, and they knew that Henry tried to advance his own descent as sufficient.

(c) Relate events as given in matter; use map to show places, and notice policy of Henry with regard to the coronation of Elizabeth.

2. (a) and (b) Relate account of leader of second rebellion, Perkin Warbeck. Whom he personated. Made up a story about his escape. Why was this story as likely to be credited as the last? When was the truth about the two princes really known? How did Henry disprove the last impostor? Why could he not do anything similar now? The very personation caused the truth to be confessed by Tyrrel. What effect on the people had this difficulty in disproving the new claimant?

(c) Warbeck sought help from Irish. How would they receive him? Why? Next with French. This led to *Treaty of Estaples* (show on map), 1492. (Explain its terms, etc.) Next with Flanders, where some relatives of Edward IV. still lived. Henry interfered. Result, the *Great Intercourse*. Why is there such a difference in Henry's dealings

with Simnel and Warbeck? Relate Warbeck's final attempts in Deal and in Ireland. How received? Scotland. Projected marriage with Catherine Gordon, who always believed in royalty of her husband. James's attitude. His invasion resulting in tax, and rebellion in Cornwall in consequence. Defeat at Taunton. Took sanctuary in Beaulieu Abbey. His end. Whom did he meet in the Tower? Their escape, and execution in 1499.

IV. *Recapitulation*: What were the chief causes of rebellion in this reign? Who headed the first insurrection? Whom did he personate? Give result of insurrection. How did Henry try to satisfy the people? What led to the second rebellion? Whom did Warbeck personate? Where did he seek help? With what results? Where was he defeated in the end?

THE SPANISH ARMADA.

Class—Oxford Juniors. *Time*—Three-quarters of an hour. *Aim*—To stimulate the imagination of the pupils while increasing their knowledge of and interest in history.

MATTER.

I. Preparation.

1. *Preliminary description of State of European Politics.*

(a)	Position of Philip II. of Spain in Europe.
(b)	Relations between England and Spain about the time of the Armada.
2. *Causes leading to, and Aim of Philip in, the Armada.*

Causes which led to the Armada :			
i.	The murder of Mary Queen of Scots.		
ii.	England opposed Philip's armies in Flanders.		
iii.	Drake had plundered Spanish ships abroad.		
Aim.	<table border="0" style="display: inline-table; vertical-align: middle;"> <tr> <td style="vertical-align: middle;">{</td> <td style="vertical-align: middle;">At Pope Sixtus V.'s invitation to invade England, seize the kingdom and make it once more Catholic.</td> </tr> </table>	{	At Pope Sixtus V.'s invitation to invade England, seize the kingdom and make it once more Catholic.
{	At Pope Sixtus V.'s invitation to invade England, seize the kingdom and make it once more Catholic.		

II. Presentation.

1. Preparations of the Fleets : the Two Fleets.

Spanish.

136 large galleons and galiasses.
20,000 soldiers, besides 8,000 sailors and 2,000 oarsmen.
2,000 cannon and all kinds of weapons.
Preparations for invasion, and war on land.
Commander—Duke of Medina-Sidonia.
Duke of Parma in Flanders at head of a large army.
Fleet took three years to prepare.

English.

Thirty small vessels—soon increased to 180 light merchant crafts.
About 17,000 men.
Commander - in - chief — Howard of Effingham.
Other noted Officers — Drake, Hawkins and Frobisher.
Allies—the Dutch fleet.

2. Plan of attack.

- (a) Sail through the Channel.
- (b) Unite with Parma's forces in Flanders.
- (c) Combined forces attack English and advance to London.
- (d) Depose Elizabeth and place Philip on the throne.

3. Chief events.
- (a) *Before reaching the Channel.*
 - i. Spanish fleet damaged in a storm—delay.
 - ii. Appears in Channel in form of crescent seven miles wide.
 - iii. Scene on the Hoe at Plymouth.
 - (b) *During attack.*
 - i. English let fleet pass, then harassed their rear.
 - ii. Small fight off Portland.
 - iii. Great losses to Spaniards off Gravelines.
 - iv. Anchored at Calais.
 - v. Parma's forces blockaded by Dutch Protestants.
 - vi. Fireships complete the defeat.
 - (c) *Incidents connected with attack.*
 - i. Oquendo's ship — and the gunner.
 - ii. Pedro de Valdez' surrender.
 - iii. The Biscay Galleon— not surrender.
 - iv. The St. Ann duel with Hawkins — Spanish unfair play.
 - v. Dutch plunder of Spanish galleon.
 - (d) *After attack.*
 - i. General confusion — between 4,000 and 5,000 killed.
 - ii. Whole Spanish fleet scattered — many of largest ships sunk or captured.

- | | | | | |
|------------------|---|-------------------|---|---|
| 3. Chief events. | { | (d) After attack. | { | iii. Remainder sailed round Scotland and Ireland, pursued by English as far as Scotland. Shattered by the storms.
iv. Only fifty-three reached Spain after two months' struggle with the elements. |
|------------------|---|-------------------|---|---|

III. Assimilation.

- | | | |
|-----------------------|---|--|
| Class deduce Results. | { | 1. To the power of Spain on sea.
2. To the power of England on sea.
3. To the cause of Catholicism at home and abroad. |
|-----------------------|---|--|

IV. Association.

1. Compare Philip II. with Napoleon.
2. Contrast modern warships with those of Spain and England in the sixteenth century.
3. Refer to the late Spanish-American War, and point to the similar causes of failure of the Spaniards.

V. Recapitulation

Of chief points of the matter.

- | | | |
|----------------|---|---|
| Illustrations. | { | 1. Map of Europe.
2. <i>Picture of the Armada, and incidents connected with it.</i>
(a) Elizabeth at Tilbury Fort.
(b) Scene on the Hoe at Plymouth.
(c) The defeat of the Armada.
(d) Drake on board the <i>Revenge</i> .
3. Sketch of a Spanish galleon, and English merchant ship. |
|----------------|---|---|

Note.—This lesson might with profit be given in two parts (about half an hour each); it is written as one lesson to preserve continuity of form.

PROCEDURE.

I. 1. Refer to history of Europe at this period, and especially to the central figure in this history. Who he was. His dominion. How was England related with Spain at this time? What connection had she in the last reign? Refer to the Spanish marriage, etc., etc.

2. Lead on to *Causes*, and draw from class by questions on the history of the times the three main causes. From a religious point of view, what was Philip's aim? His ideas as regards religion? Refer to lesson on character. Finally mention Pope Sixtus V.'s attitude. How was the aim viewed in England, and why?

II. 1. Compare preparations of our own times and in the olden times. Why was it necessary to spend three years in preparation? Relate circumstances connected with Spanish preparations for the "Invincible". The effect on people. Why? The mistakes made, etc., and give names of leaders. Use map to show Tagus. Show sketch of Spanish galleon, or draw on blackboard. Compare with modern ships—advantages and disadvantages, etc.

Now we turn to *England*. Her attitude: hope or fear? Why? What about her navy then? Who lent vessels? "There came a gallant merchant ship full sail to Plymouth Bay." Commander. What religion? What does this prove about general attitude of England? (All creeds combined to resist it, and religious struggle for a moment put aside.) Other officers of note. Ask questions to find where we hear of Drake before this. Frobisher and Hawkins. What do we owe to them? Name allies. Why the Dutch? What relations had Elizabeth with the Dutch?

2. Explain plan of attack, and trace on map. Are first plans always successful? Give some examples where they have been entirely abandoned, and altered. (Cf. Transvaal War.) Who was the Duke of Parma? Where have we heard of him before? If the combination had succeeded, would the conquest have been secure? Why? What was

the immediate object? And when Philip was on the throne, what then? Why? Did the Catholics not seem to wish for Philip? (Loyalty of English always.)

3. Relate series of mishaps which attended the "Invincible" from the very outset. (Show photo with ships in form of crescent.) What was the object of this position? Compare Trafalgar. Spanish and French in crescent. Describe scene on Hoe at Plymouth. Show picture of the game, and ask why all were so unconcerned. When fleet appeared it was allowed to pass. Why? The wind unfavourable to Spanish but not to English. Why could not English fleet face the crescent? Describe the various Channel fights: Portland, Gravelines. Anchored at Calais. English success with such smaller crafts. Why? What about Parma? Were any in Holland favourable to Elizabeth? Who? They showed this now by blockading Parma's fleet. Result, and final success by means of fireships. To add to interest relate incident mentioned in matter, and draw from class how character of opponents was seen on those occasions.

After attack. What would be result of such a defeat? What was the only route open to returning to Spain with safety? Give account of the journey round Scotland and Ireland. The wrecks and the relics of the saved who settled on these coasts seen to-day, especially North of Scotland. (Organ and chandelier to be seen in Trinity College, Dublin.) Why were the ships in great danger in coasting these countries north? Trace journey on map. Only fifty-three ships returned to Spain. Out of how many?

III. Deduce from class the results of this great victory, first, as regards power of Spain at sea. How would this be affected? Why? Has she shown any great power since at sea? (Late Spanish-American War.) On contrary, what then was the effect on English power at sea? Name some other naval victories that secured our power at a critical moment. (Camperdown, Trafalgar.) As regards religion, how was the Catholic cause affected? Why in this way?

IV. Compare Philip II. and Napoleon as to ambition, aims and methods, and success of his enterprises. Which character is to be preferred? Contrast modern warships with those of sixteenth century. Show pictures of each, and draw from class general advantages of one and disadvantages of the other. As regards bravery and courage, which kind of warfare (modern or old-fashioned) leads to the greatest exercise of these virtues? Refer again to Spanish-American War, and point to similar causes of failure of Spaniards.

V. Recapitulate chief points of matter, and write principal heads on blackboard—class to reproduce account in their own words in form of an essay.

NOTES OF A LESSON ON THE PROSPERITY OF ENGLAND DURING REIGN OF ELIZABETH.

Class—Age, 16 to 17 years. *Time*—Three-quarters of an hour. *Aim*—To give class an accurate idea of the state of England in Elizabeth's reign.

MATTER.

I. Preparation.

A few questions as to the character of the Tudor Sovereigns in general—powerful rulers, the material prosperity of country necessarily great.

II. Presentation.

I. AGRICULTURE.

- | | | |
|---|---|---|
| New methods and
their conse-
quences. | { | <p>(a) Change in mode of cultivation favoured production.</p> <p>(b) Change, moreover, brought about a taste for improvement.</p> <p>(c) This more careful and constant cultivation necessitated greater number of hands.</p> |
|---|---|---|

Hence this state of things was a distinct gain to many among labouring classes.

2. MANUFACTURES.

- Industries and
their localities. {
- (a) Woollen manufacture an important element.
 - (b) Silk weaving introduced.
 - (c) Weaving, fulling and dyeing of cloth spread rapidly over country.
 - (d) Worsted trade, centred at Norwich, extended over whole of eastern counties.
 - (e) Iron manufactures in Kent and Sussex for northern towns began to rise.

This development of manufactures gave work to the unemployed.

3. COMMERCE.

- Commercial seats
and countries
traded with. {
- (a) Cannot judge of it by any modern standard, for whole population can hardly have exceeded five or six millions.
 - (b) Most important part with Antwerp and Bruges.
 - (c) After siege and ruin of Antwerp by Duke of Parma supremacy of our own capital first established. One-third of Antwerp merchants and manufacturers took refuge on banks of Thames.
 - (d) Growth of Boston and Hull marked an increase of commercial intercourse with North.
 - (e) Prosperity of Bristol, which depended in great measure on trade with Ireland, stimulated by colonisation.
 - (f) Trade with Russia created.
 - (g) Lucrative traffic with coast of Guinea, to whose gold-dust and ivory the Southampton merchants owed their wealth.

4. SOCIAL.

Wealth and Comfort—the characteristics.

- (a) Conception of domestic comfort takes its rise from this period. Carpets, silver, pillows in general use.
- (b) Tendency to luxury and display of all kinds.
- (c) Great households fast breaking up. Whole of feudal economy disappearing.

5. ARCHITECTURE.

Characterised by pomp and elegance.

- (a) Dwellings of brick and stone superseded rough wattled farmhouses.
- (b) Gloomy walls and serried battlements disappeared from dwellings of the gentry, strength fast giving way to magnificence and elegance.
- (c) Prodigious use of glass a marked feature.

III. Association.

The procedure and different illustrations used.

IV. Recapitulation.

Questions as in procedure.

V. Application.

Class to take down heads of matter and write a short essay on the subject for next lesson.

PROCEDURE.

I. Introduce lesson by questioning class as to the state of England during the reigns of Henry VII. and Henry VIII. with regard to material prosperity. Why was it so prosperous? Why had it not been so prosperous under the preceding dynasties?

Point out that during the reign of Elizabeth this prosperity reached its zenith, not only in one department, but in many.

II. Improvements may be classed under five heads, *viz.*: Agriculture, Manufactures, Commerce, Social Progress and

Architecture. Tell how new methods of agriculture were introduced, and draw from class that under these methods the land naturally improved. How would the farmers be affected by seeing the great improvements consequent upon the improved systems? They were stimulated to greater efforts, and hence was developed in them a taste for improvement which resulted in raising the tone of this portion of the people. Draw from class that, as the cultivation of the land became more constant and careful, a greater number of hands were required for the work. Let class point out who would be the gainers by this, and show that if this had been the only improvement it would have been much.

As regards manufactures, then, as now, the woollen manufactures formed a most important element in the national wealth; but it was confined to the West of England. What is the seat of the woollen manufacture at the present day? Point out places on the map. Tell how we are indebted to the French for the introduction of silk weaving—to the numerous Huguenot emigrants who settled at Spitalfields. Hitherto England had sent all her fleeces to the Continent to be woven and dyed, but now the weaving, fulling and dyeing were carried on at home, and were spreading rapidly over the country. The worsted trade, which was centred at Norwich, began to spread all over the south-eastern counties, and the farmers' wives began everywhere to spin their wool from their own sheep's backs. What advantage was there in all this? Women became thrifty and domesticated, and were kept from the miseries of idleness. Then the iron manufacture was carried on, but was confined to Kent and Sussex. Where is it carried on now? Why? Point out that the manufactures were gradually transferred from these counties to the northern towns, and draw from class the consequence of this transference, *i.e.*, that Manchester, York, Halifax, etc., began to rise in importance. What class of people specially profited by this development of manufactures? The working classes. Show advantage of this, for as long as these were well employed they were guarded against discontent and its

consequent evils. Draw from class that commerce was furthered by this development of manufactures. Point out that we cannot judge of it by any modern standards, and why. Most important branch was with Antwerp and Bruges, but after siege of Antwerp many merchants came over and settled on banks of Thames. What was the effect of this?

Boston and Hull then began to grow in importance, and increased in intercourse with North of Europe. Prosperity of Bristol greatly stimulated by colonisation of Ireland. Show Bristol on map, and point out reason for this intercourse—ease of access. Tell of the discovery of Archangel by Richard Chancellor, and let class say what advantages accrued to England from this, *i.e.*, trade with Russia opened up. Besides all this, a lucrative trade with Guinea was begun. Show Guinea on map, and let class say what it is noted for. This trade proved a great source of wealth to the Southampton merchants. Point out the shame that it brought to England by being the cause of the beginning of slave trade, which was not abolished till 1833.

Now to come to social progress. Point out that in some ways it can hardly be considered progress. First notion of domestic comfort, however, takes its rise from this period. Carpets now came into fashion. What had been used hitherto? Pillows, which had formerly been despised, now came into general use. Use of silver almost general. Some yeomen had quite a fair show of plate. Great tendency towards luxury and display of all kinds. People were becoming more particular in choice of food, and were not satisfied with the simpler fare of former days. Consumption of wine, too, increasing. Cecil, the Minister, complained that "England spendeth more in wines in one year than it did in ancient times in four". Dress, also, became much more lavish. Queen's robes rivalled by the slashed velvets, ruffs and jewelled doublets of the courtiers. Green says: "Men wore a manor on their backs". Show pictures of the costumes of the period. Draw from class the effect of all this luxury on the character and habits of the

people. How did Elizabeth look upon these social changes? Why?

Increase of wealth influenced the architecture of the time. Rough wattled farmhouses began to give way to dwellings of brick and stone. This served to beautify the towns. Show pictures of mediæval castles and of Elizabethan architecture, and let class point out wherein the differences lay. Another marked feature was the prodigal use of glass. Long lines of windows stretched across the fronts of the new manor-houses. Draw from class the advantages of this from a physical point of view. The enjoyment of light and sunshine was a mark of the temper of the age. Lord Bacon on this: "Your houses are so full of glass, that we cannot tell where to come to be out of the sun or the cold". Here read passage from Green, p. 388—"Transformation . . . oriel," p. 389. Point out to class Elizabeth's contribution to this development was the peace and order from which it sprang, and the thrift which spared the purses of her subjects. She contented herself with the ordinary resources of the Crown.

IV. *Recapitulation*: Under what heads may we class the progress of the country during Elizabeth's reign? What benefits were derived from the improved system of agriculture? What were the chief industries, and where were they carried on? Who were the gainers by this development of manufactures? Why can we not compare the commerce of the period with that of the present day? What English towns rose in importance? and why? With what foreign countries did England trade? What were the characteristics of the social life of the period? What advantages and disadvantages from this? What of the architecture?

CHARACTER OF PHILIP II. OF SPAIN (1527-1598).

Class—Oxford Juniors. *Time*—Three-quarters of an hour. *Aim*—To stimulate the imagination of the pupils while increasing their knowledge of and interest in history.

MATTER.

I. Preparation.

1. Refer to class's previous knowledge of him as to—
 - (a) Queen Mary's husband.
 - (b) Author of Armada.
 - (c) Who he was.

II. Presentation.

1. Son of Charles V., Emperor of Austria, grandson of Jane the Mad and Philip the Handsome of Burgundy.
2. Heir to the greatest heritage that Christendom has ever seen.

- | | | |
|-----------------------------------|---|--|
| (a) <i>Hereditary Tendencies.</i> | { | <ol style="list-style-type: none"> i. To periods of gloom. ii. To extreme religious views bordering on madness. iii. To consider himself a "junior partner" with Providence in the establishment of an universal supremacy of Catholicism through Spanish influence and power. |
| (b) <i>His Training.</i> | { | <ol style="list-style-type: none"> i. Hereditary tendencies accentuated by his father's constant wars with heretics. ii. Narrow - minded religious views deeply instilled. iii. Instructed by his father in politics, taught self-control and distrust of others, to be secret, crafty and over-cautious. iv. Lost the soft influence of his mother at the age of twelve, hence his cold, hard exterior. |

(c) *Character as a King.*

- i. Essentially a statesman, not a soldier.
- ii. His whole career influenced by his conviction of Divine appointment to do the Almighty's work.
- iii. Hence his depending too entirely on supernatural means and neglecting the temporal.
- iv. His distrust of others and desire of blind obedience from all while he ordered every point.
- v. His painstaking and laborious attention to details, and no sense of proportion as to their religious importance.
- vi. His marble serenity, unmoved in the midst of failure, trusting to the belief that his cause was God's, and therefore must succeed at last.
- vii. Independent in dealing with the Pope about powers of Inquisition.

(d) *His Domestic Character.*

- i. A dutiful son.
- ii. A faithful and affectionate husband to all four wives, under difficult circumstances.
- iii. A patient and loving father. (Don Carlos.) His natural character reveals itself in his family life.

IV. Application.

As in procedure.

V. Recapitulation.

Set pupils an essay on foregoing, *or*, bid them institute a comparison of Spain under Philip, and England under Elizabeth.

PROCEDURE.

III. Association.

I. Lead class by questions to see that Philip in both (a) and (b) was moved by the same ambition and desire to restore Catholicism through the supremacy of Spain.

Show that he was regarded as the Champion of the True Faith by reason of his dominions.

(a) Here give his parentage, alluding to his grandmother's mental state, showing that it passed on to his father after middle age, and his son in youth. What is therefore to be expected in Philip? Point out what form these hereditary tendencies took in him. His training only strengthened his views. Refer to his father's work at the time—the Reformation just beginning—war on heretics in his dominions. What influence it must have had on Philip.

(b) Describe shortly the character of his early teachers. Narrow-minded devotees, and elicit the effect on him. Also, his mother's death, and falling entirely under his father's control and influence. Describe the kind of training received from him, relating his advice to him about counsellors when entering on his life as king at sixteen years of age. Mention, in passing, how well he followed it through his whole career, and especially in the Armada.

(c) Deduce that he was a statesman and no soldier, from fact that there is no record of his taking part in any battle during the many wars. Contrast him with Charles I. in idea of Divine appointment, and also favouritism, showing that his independence of latter was logical result of former. Describe, however, his Court policy, and how it affected the government of the kingdom and his popularity. Refer to Philip's policy in England as Mary's husband (moderation). Also, his independence of the Holy See in ecclesiastical affairs and in his rule of Naples, and use of the Inquisition. Instance of Pope's Bulls suppressed in Spain, and the treatment of Carvanza.

(d) Deduce by question in matter already assimilated by the class the points remarkable in the domestic character of this king, and how his natural character shows itself most in his family life.

IV. *Application*: Draw moral lesson concerning the formation of character. How are we affected by our surroundings, our company, and our history? Cf. Napoleon.

V. *Recapitulation*: As in matter.

NOTES OF A LESSON ON THE MARIAN PERSECUTIONS.

Class—Age, 16 years. *Time*—Three-quarters of an hour. *Aim*—To lead class to a just and impartial knowledge of the matter and its results to Catholicism in England.

MATTER.

I. Preparation.

Religious changes under Henry VIII. and Edward VI.	1. Under Henry VIII.	<p>Broke with Rome on divorce question.</p> <p>Claimed supremacy.</p> <p>Suppressed monasteries, etc.</p> <p>Hertford and Council Protestant in sympathies.</p> <p>Cranmer from a bad Catholic drifted into Protestantism.</p> <p>Six Articles repealed, forty - two Articles passed.</p>
	2. Under Edward VI.	<p>Book of Common Prayer.</p> <p>New Communion Service.</p> <p>Sweeping changes. Marriage of clergy.</p> <p>Pictures and images destroyed.</p> <p>Altars abolished.</p> <p>Revolts, e.g., in Devon and Cornwall, put down with great severity.</p>

II. Presentation.

- | | | |
|---|--|--|
| 1. Position of Catholics at Mary's accession. | {
(a) In England.

(b) On the Continent. | {
In a state of indecision as to their duty until Council of Trent.

Hence divided into two parties.
{
i. Those who admitted the supremacy partly.
ii. Those who refused to take the oath.
Church had suffered great pecuniary losses under Edward.
Catholic Powers of Spain, Austria, France and the Emperor against Germany and Holland. |
| | | |
| 2. Political Factors in Matter. | {
(a) The Spanish marriage.

(b) Wyatt's insurrection. Protestants in panic.

(c) Submission of Parliament. | {
Emperor sided with Rome and Philip. His son shared his opinions, and Mary and England were involved in same.
Meant submission to Rome.
Secured throne for Mary Queen of Scots.
Followed the marriage.
Was made to Cardinal Pole, led finally to the revival of the <i>Statute of Heresy</i> . |
| | | |
| | | |

3. The Persecutions. {
- (a) Were outcome of misplaced, ill-advised zeal.
 - (b) Were against advice of Cardinal Pole and many bishops.
 - (c) Were cruel and against true interests of religion.
 - (d) Resulted in great ill-feeling in England against Catholics. Death of Ridley and Latimer, etc.
 - (e) Did more than anything else to make Protestants popular since the persecutions were identified with the Spanish Philip against *Englishmen*.

III. Association.

See the procedure.

Summary : The religious strife begun under Henry VIII. and Edward VI. led under Mary Tudor to reprisals, and by the Statute of Heresy formerly used against Lollards, many Protestants were tried and condemned to death. In thus acting, Mary, far from advancing the cause she had at heart, really did much harm and roused a hatred of Catholics which still exists.

IV. Recapitulation.

Questions as in procedure.

V. Application.

Show how true charity leads us to be tolerant, and conclude by a few remarks on the evils caused by bigotry.

PROCEDURE.

I. 1. Introduce lesson by questioning class as to the claims which Henry made to be Head of the Church, and show them how, by the suppression of the monasteries, many thousands of the poor were left without means either spiritual or temporal. Show how ill-instructed Catholics would not know how to act when time of danger really

came. Discuss the policy of Cromwell, and show how moderate it was, and draw from class the reason of Cromwell's downfall.

2. Begin by questioning class as to Council appointed by Henry VIII. Show its *Protestant bent*, as was also that of the character of Edward VI. If possible enumerate changes, and write chief on blackboard. Show class how these affected the large class of the uneducated already left without guides since 1536 and 1539. Tell, however, of the popular revolts, and show on map the chief strongholds of the ancient faith. Relate how great and severe measures at the point of the sword were adopted, and describe the period of Protestant misrule which preceded the death of Edward. Elicit from pupils that in such times of disorder men eagerly follow what promises to restore peace and order.

II. 1. (a) Illustrate the various opinions held about what was lawful and not lawful as to compliances with regard to the new religion. Get from pupils the names of those who best understood the trend of "Royal Supremacy," *i.e.*, More and Fisher, and even Erasmus, and compare them with Margaret Roper and Gardiner. Illustrate further by the terms *Papist* and *Church Papist* the two classes of Catholics.

(b) Show on map of Europe the Catholic Powers, and describe the position of the Emperor Charles and his relationship to Philip. If possible, get from class the traditional feeling of Christendom as to the Pope's temporal power. Point out the extent of the Protestant revolt.

2. (a) Lead pupils to see why England was averse to the Spanish marriage, and why the nation preferred it to Mary of Scots, and lead class to see that Scotland was an ancient enemy. Refer to Pinkie.

On the other hand, show how it would involve Mary and England in European politics, and get from class which side she was most likely to take.

(b) Tell how all this led to Wyatt's futile insurrection, and show how this attempt strengthened Mary in her

position. Lead class to see how Mary had some of her father's pure obstinacy, and point out that she was narrow in her views, though otherwise a good woman.

(c) Describe the progress of Cardinal Pole up the Thames, and the events which soon followed.

Refer to the Statute of Heresy; get date when first passed and against whom used. Get other instances of burning, *e.g.*, Joan of Arc.

3. Show that we must not judge those times by the standards of the present century. Ask why not.

Enumerate the Protestant martyrs, and impress on class the injustice of not accepting Cranmer's recantation.

IV. 1. What was the most important religious change under Henry VIII.? 2. Name three political events which greatly influenced Mary and her advisers. 3. Why do we condemn the action of Mary? 4. What were the Catholic Powers in Europe after the Council of Trent?

V. *Application*: As in matter.

NOTES OF A LESSON ON THE CHARACTER OF JAMES I. OF ENGLAND.

Class—Average age, 12. *Time*—Half an hour. *Previous Knowledge*—Principal events of his reign. *Aim*—To lead class to draw conclusions from facts and events by eliciting character of James I.

MATTER.

I. Preparation.

State of England on death of Elizabeth, the last of the Tudors.	{	Great prosperity with regard to commerce and social life.
		Religion in a disturbed state, three-fourths Puritans. Catholics hoping for better things under James I.

II. Presentation.

- i. Principal faults in James's character and the events which called them forth.
- | | | |
|----------------|---|---|
| (a) As a man. | { | i. Vanity and conceit in his own wisdom. |
| | | ii. Weak-mindedness. |
| | | iii. Duplicity. |
| | | iv. Obstinacy. |
| (b) As a king. | { | i. Tyranny, seen in his dealings with his Parliament. |
| | | ii. Prodigality. |
| | | iii. Favouritism, shown in his treatment of Buckingham. |

James's failure due in great part to the tyranny of his predecessors, the Tudors.

2. Good points in his character.
- | | | |
|-----|---|---|
| (a) | { | As a king he is devoid of good qualities, but as a man he possesses the following:— |
| | | Just in his intentions. |
| | | Love of learning. |
| | | Humour. |

III. Association.

Compare James with Edward II. Both were addicted to favouritism and tyranny. With Richard II.; both being worthless sons of good parents.

IV. Recapitulation

Of points in his character, both good and bad.

V. Application.

As James had suffered from the despotism of the Tudors, so Charles I. was to suffer the effects of his father's misgovernment. Here say a word about considering our actions in the light of their consequences to others. Mention the Reformation, etc.

PROCEDURE.

I. Question class on the state of England on the death of Elizabeth. Why was the nation so prosperous? What was the state of the country as regards religion? What were the Catholics expecting? Why?

II. 1. Let us see now whether James was the kind of man to answer their expectations. We shall consider him under two aspects: (a) That of a man; (b) That of a king.

(a) James was very learned, and in consequence of this fell into a fault to which learned people are often liable. He was vain, and did not turn his knowledge to account. Henry IV. of France called him the wisest fool in Christendom.

i. Vanity, then, is one point in his character.

You remember how James allowed himself to be led by his favourites. Who was the chief among these? Now what would you say of a man that allows himself to be led so easily by others, particularly when they are bad advisers? That he is weak.

ii. Weak-mindedness was James's second defect.

Before he came to the throne he promised the Catholics toleration, and then he broke his promise. What do you say of people who say one thing and mean another?

iii. Hypocrisy or duplicity his third fault.

Last of all, how did he accept the advice given him by the Parliament? Why would he not listen to it? What fault is that, to refuse to listen to good advice because we think we know better?

iv. Obstinacy his fourth fault.

(b) Then elicit his faults as a king.

i. Tyranny, in refusing to listen to the just demands of Parliament.

ii. Prodigality, shown in his expenditure.

iii. Favouritism.

James was not wholly to blame for his failure in government. He came at a difficult time. What sort of rulers were the Tudors? Tyrannical, therefore inclined the people to discontent and risings.

2. Like every one else, James was not without his good points. His intentions were just, but he did not carry them out. Show class that it is not sufficient to mean well. Then he loved learning, which is a good point, and he was very good-humoured.

III. Now let us see if James is like any other king we know. What other king was ruled by favourites and tyrannised over his subjects? Edward II. He also resembles Richard II. in being the bad son of good parents.

IV. What points of character does James display as king? How does he show his vanity? His obstinacy? Why is he not wholly to blame? With what kings may he be compared?

NOTES OF A LESSON ON THE CIVIL WAR IN REIGN OF CHARLES I.

Class—Age, 16 years. *Time*—Forty minutes. *Aim*—To exercise imagination of class in following fortunes of Charles during the Civil War.

MATTER.

I. Preparation.

Refer to Charles's Parliament and the mind of the nation after suffering so many wrongs.

Meaning of civil war.	{	One carried on between two parties of the same nation. In this case one party siding with, other against, king.
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II. Presentation.

1. Cause of war.	{	(a) Remote cause.	{	i. Tyranny of Tudors.
				ii. Misgovernment of James I.
				iii. Incapacity of Charles.
	{	(b) Immediate cause.	{	Refusal of Charles to give up all armed forces to the control of Parliament.

2. Leaders.	{	Royalists — Charles and his nephew, Prince Rupert.
		Parliament—Earl of Essex, Cromwell, John Hampden.

3. Object. { To take from Charles the power of which he made such bad use.

4. Battles fought. {
 (a) Edgehill, 1642; favourable to Charles.
 (b) Brentford, 1642; gained by Parliament.
 (c) Chalgrove, 1643; gained by Royalists.
 (d) Stratton, 1643; gained by Royalists.
 (e) Atherton Moor, 1643; gained by Royalists.
 (f) Lansdown, 1643; gained by Royalists.
 (g) Roundaway Down, 1643; gained by Royalists.
 (h) Newbury, 1643; gained by Parliament.
 (i) Cropredy Bridge, 1644; indecisive.
 (j) Marston Moor, 1644; gained by Parliament.
 (k) Naseby, 1645; gained by Parliament.
 (l) Tippermuir, 1644; gained by Royalists.
 (m) Philiphaugh, 1645; gained by Parliament.

Charles gives himself up to Scotch Parliament.

5. Result. { Royal power totally destroyed.
 { King taken prisoner.

III. Association.

Compare with Wars of Roses as to:—

- (a) Cause.
 (b) People engaged.
 (c) Results.

IV. Recapitulation.

Question as in procedure.

V. Application.

Map to be drawn by class marking districts which were for the king and those which were for the Parliament, and writing a short account of causes and results of the war.

PROCEDURE.

I. Introduce lesson by a few questions on the Parliaments, and draw from class that the result of all Charles's injustice was a feeling of great indignation amongst his subjects. Looking back in history, what have we seen to be the result of oppression? Get examples from class: Barons' War,

Wat Tyler's Insurrection, Pilgrimage of Grace, Ket's Rebellion. Human nature had not changed, therefore Charles's conduct brought about same results, rebellion in the hope of obtaining better things. What do we call a rebellion where two parties of a nation are at variance?

II. Draw from class the causes that had led up to the war. What act on part of Charles was the immediate cause of war? Point out reason why nation feared to leave Charles in possession of the army, *viz.*, that he would use it for his own purposes. Point out which class of the nation sided with Charles, *viz.*, chiefly the nobles and aristocracy and the Catholics. Show reasons of this: (1) The middle classes had grievances on the subject of religion—greater part Puritans, who objected to the king's innovations. (2) These also resented more than others anything which interfered with their privileges. (3) The middle classes, too, knew Charles only as the tyrannical king, while the nobles and aristocracy knew more of him personally, and so could appreciate his good qualities. Tell of the loyalty of the Universities. St. John's College stripped its roof of the lead to make bullets for the king. Catholics sold their plate. Tell of Basing House called "Loyalty Castle". War began in 1642, the leaders being Charles and his nephew on one side, and Earl of Essex, John Hampden and Cromwell on other. Mark on sketch-map districts held by each party at the beginning of war; put in Edgehill as scene of the opening battle. In beginning of war Charles generally victorious. Draw from class the reason of this, *i.e.*, army of Parliamentarians composed chiefly of merchants and those unaccustomed to arms. Cavaliers, on contrary, skilled in horsemanship. Difficult to say how it would have turned out had not Cromwell seen necessity of training his "Ironsides". First appearance of these at Marston Moor, where Charles sustained a crushing defeat. Mark battles on sketch-map as lesson proceeds. Surrender of Charles to army after Naseby, 1645. War resulted in total defeat of king, and his capture.

III. Compare with the Civil Wars of the Roses, and draw from class how the Transvaal War differed from those.

Summary : Charles's tyranny and his refusal to give up the command of the army led to the Civil War in 1642. The nobles and aristocracy for the most part sided with the king, whilst the middle classes were against him. First battle fought at Edgehill, 1642—indecisive, yet somewhat favourable to the king. In the beginning king's army was successful, because better trained and disciplined than that of Parliamentarians'. Cromwell perceived reason of king's success, and trained his Ironsides, whom he first used at Marston Moor, 1644, with disastrous results to the king and Royalist cause. Several battles fought with varying success until that of Naseby, 1645, after which Charles surrendered to Scotch army. This closed first period of the war.

IV. What paved the way for the Civil War? What was the immediate cause? What was the object of the war? Who were the two parties engaged? Why was Charles successful at the outset? Who discovered the secret of his success? What use did Cromwell make of this knowledge? What was the result of this training of the Parliamentary army? What battle closes the first period of Civil War?

V. *Application* : As in matter.

NOTES OF A LESSON ON THE BATTLE OF MARSTON MOOR.

Class—Average age, 15. *Time*—Three-quarters of an hour. *Previous Knowledge*—Outlines of Civil War. *Aim*—To exercise imagination of the class, and make them interested in the successes and failures at Marston Moor.

MATTER.

I. Preparation.

- | | | |
|---------------------------------|---|--|
| 1. Progress of the war in 1644. | { | Royalists held North, West and South-west. |
| | | Ironsides formed in East. |
| | | Charles at Oxford. |

II. Presentation.

1. Immediate cause of battle.
 - (a) York under Glemham and Newcastle hard pressed by Parliamentarians. } N. Leven. S. Fairfax.
 - (b) Charles's message to Rupert, "Save York, and fight at all costs".
 - (c) Siege abandoned and Parliamentary troops march west to bar the way of relief force.
2. Opposing forces.
 - Cavaliers, { Rupert, 8,000 horse, "God and the King". { 10,000 foot ; O'Neil, Newcastle, Goring.
 - Roundheads. { Manchester's } Ironsides. army. } Scotch. { Leven's army. Fairfax, father and son.
3. Plan of battle. { Position of forces near, only ditch and road between.

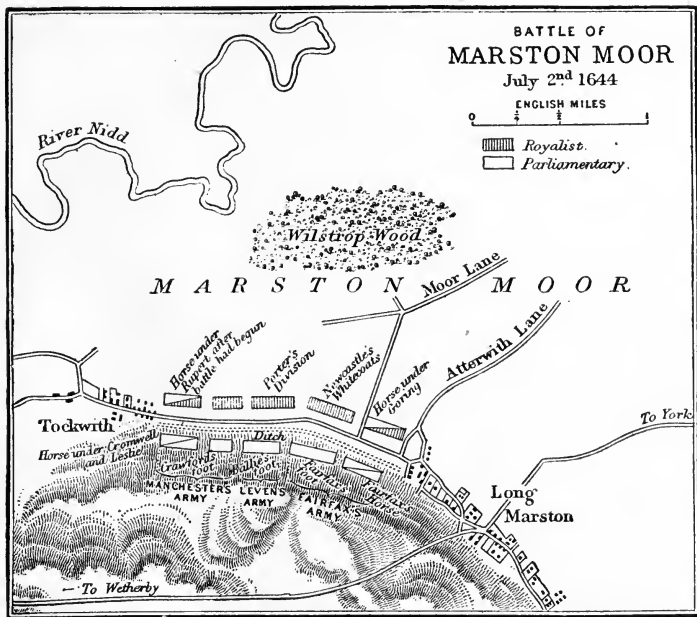
Advantages :

- (a) Rye-field on rising ground.
- (b) Ditch in front.
- (c) Royalists more cavalry.
- (d) Parliamentarians more infantry.

4. Course of battle.
 - (a) Three till five, desultory firing. Corporal in Royalist army slain by first shot. Frequent rainstorms.
 - (b) Six o'clock, consultation ; agreed to retire.
 - (c) Attack suddenly begun by the Parliamentarians. Nephew of Cromwell killed.
 - (d) Meeting of Cromwell's and Rupert's forces. Cromwell wounded. Retreat of Rupert.
 - (e) O'Neil repulsed. Newcastle roused.
 - (f) Fairfax chased Goring to York ; "White Coats" routed rest of Fairfax's army.
 - (g) Scotch regiments fled under Leven.
 - (h) Manchester ran away, but returned.
 - (i) Final rout by Cromwell. Royalists fled to York. 4,000 dead lay on field.

5. Result.

Royalist cause lost in North.
Flight of Newcastle; loss of 100 colours.
Surrender of York and Newcastle.
Turning point in Civil War.



III. Association.

Illustrations.

Map of England, showing strength of opposing parties in 1643.
Pictures of relics of the battlefield; style of armour, and arms in use.

Contrast war of 1644 with Boer War as to

Command of forces.
Arms, method of fighting { swords, guns, cannon.
Condition of army { uniform, armour.
Commissariat.

IV. Recapitulation.

What were the immediate causes of this battle? The forces engaged? The chief leaders? What action saved the Parliamentarians? What act was fatal to Royalists? Who was against fighting and who for it? Why is this called the battle of "Runaway Generals"? Who showed special bravery? Who came out best after the battle?

What were its final results? In how many ways may we compare the warfare with that of the Boer War? etc.

PROCEDURE.

I. Question class as to conditions of opposite parties in the Civil War. What parties were gaining? Why? Did the Parliamentarians realise their weakness? Who determined to overcome the difficulty? (Show map to explain how much of country still held by Royalists.) What victories were already won by Charles? Who were leaders on his side? on opposite side? By 1644 where was Charles's great stronghold? At this time Charles was at Oxford.

II. 1. Tell of success of Ironsides in East, Lincolnshire, etc. Advance of Scotch in North, and progress of Rupert in West: *hence* position at York dangerous. Message of Charles to Rupert. Hesitation of Parliamentarians and final resolve to abandon siege and cut off relieving force under Rupert. Result—meeting at Marston Moor.

2 and 3. Draw plan, completing it during course of lesson, and describe opposing forces; tell of dispute between Rupert and Newcastle and its issue, also retreat of Manchester's army and its recall on seeing movement of Rupert.

From position and plan deduce advantages and disadvantages to each side.

Compare Hastings and Agincourt with regard to hill. Number of cavalry (these regiments originated in the Civil War). Number of forces on each side not always a test of result (Boers in Transvaal War).

4. *Course of Battle*.—Describe weather, etc., time of beginning, unsettled state of forces on each side. Final agreement to retire—Newcastle to bed and Rupert to dinner! Sudden attack on part of Parliamentarians. First shot Sir

John Houghton and Cromwell's nephew wounded. Retreat of Rupert. Newcastle roused. Action on right wing, Goring chased to York; reaction on part of White Coats.

Scotch regiments fled under Leven. Manchester fled, but returned. Action of Cromwell saved the day. Royalists fled to York by Micklegate Bar. Four thousand dead on field: excavations in 1858 and 1859 prove the amount of carnage, etc.

5. What was result to Royalists? to Parliamentarians? Which general came out best after battle? What had Newcastle done? White Coats? etc.

Here note name of battle: "Runaway Generals".

Causes of Failure.—What would disunion on one side lead to? Would position of forces help on results? Which side had greater advantage? Compare method nowadays of supreme commander-in-chief, who regulates major tactics, and generals the minor tactics. Compare General Buller and Transvaal War.

III. *Association.*—Show illustrations and compare with Transvaal War as to:—

Command of Forces.—"Union makes strength"—one commander-in-chief. In former times bravery of one often lost battle, as in present case.

Arms.—Heavy armour a hindrance; pistols, not many guns; often hand-to-hand fight, and now Gatling guns, 15-pounders, etc. So much ammunition to kill one man, as seen from statistics of Crimean War.

Condition of Soldiers.—Ill fed and badly paid, depended much on energy of commander. In modern times, compare transit of supplies to the Transvaal and likeness between Boers and Parliamentarians. Want of provisions obliged a retreat.

NOTES OF A LESSON ON THE CAREER OF OLIVER CROMWELL.

Class—Oxford Preliminary. *Time*—Half an hour. *Previous Knowledge*—Civil War and the Commonwealth. *Aim*—To lead class to an appreciation of the man by following him in the different stages of his career.

MATTER.

I. Preparation.

Question class on what they already know of Cromwell.

II. Presentation.

Birth and Parentage.	{ Son of Robert Cromwell, a gentleman of Huntingdonshire, said to be connected with House of Stuart. Born 1599.
Early Education.	{ Educated at first at a school at Huntingdon. Later on at Cambridge, whence he was recalled by the death of his father. Settled on his estate.
Public Career.	{ <ol style="list-style-type: none"> 1. Elected Member of Parliament for Huntingdon in 1628. Did not take an active part in its proceedings, though he opposed Charles's scheme for draining the Fens. 2. In 1640 elected member for Cambridge, and soon showed himself to be on the Parliamentary side. 3. Civil War being declared, Cromwell threw himself heart and soul into it. Parliamentarians at first unsuccessful. Cromwell sees reason, and remedies it. 4. Victory over Charles at Marston Moor; beginning of his fame. 5. Created Lieutenant-General of Parliamentary forces, which he reorganised. 6. Defeats Charles at Newbury and Naseby, 1645. 7. Appointed Lord-Governor of Ireland. 8. Proclaimed Lord-Protector of the Commonwealth, 1653. 9. Quelled insurrection in Ireland. 10. Engaged in a war with Spain, in which he was victorious.

Closing years.	{	For a year or two before his death his health began to fail.
		One of his last acts was to dissolve the Parliament, and before he could summon another, health gave way owing to care and anxiety. Died 1658, on the anniversary day of two great victories.
Character.	{	Cruel, shown by his ruthless massacres in Ireland.
		Unscrupulous, shown in his treatment of the king.
		Narrow-minded in his application of everything to religion.
		Tyrannical, shown in his treatment of the Parliament.
		Ambitious of power. Superstitious.
		Great decision and energy of character, shown in his discipline of army.
		In domestic life a good husband and father.

III. Association.

Compare him with Thomas Cromwell, so as to make class distinguish between the two.

IV. Recapitulation.

Question on heads of matter.

V. Application.

Show that Cromwell desired power, and succeeded in obtaining it. It did not, however, bring him happiness. Power does not always mean content, especially if unlawfully acquired.

PROCEDURE.

I. Introduce lesson by a few questions on what the class know already of Cromwell. Draw from class that he is a very important character in history; but for him the fortunes of England might have been different from what they are.

II. He was born in 1599. Here notice his 300th anniversary. Son of a Huntingdonshire gentleman, said to be connected with the House of Stuart. Early education carried on at a school in Huntingdon; later on sent to Cambridge, etc. Public career begins with his election as member for Huntingdon in 1628. Connect this date with Charles's third Parliament and the Petition of Right. Do we hear anything of him in connection with this third Parliament? Why not? Because it was his first election, and he was still a young man. However, mention is made of his opposing Charles's scheme for draining the Fens. Draw from class what draining the Fens would entail, and why Cromwell opposed it. In 1640 he was elected member for Cambridge. What Parliament was this? What was the great work of this Parliament? Presented the "Grand Remonstrance" and conducted the trial of Charles. Cromwell showed himself to be on the Parliamentary side, one reason for this being his religious opinions, which were very Puritanical. Civil War declared in 1642. Cromwell threw himself heart and soul into it. Draw from class where the successes lay in the beginning of the war. Why was this? Who would be the first to see cause of this success? What did he set himself to do? What was the consequence of this superior training? At what battle did the Ironsides first distinguish themselves? Draw from class the effect of this great victory on Cromwell's career.

After victory at Marston Moor he was created lieutenant-general of the Parliamentary forces. Tell class how he proposed the passing of the Self-Denying Ordinance for the purpose of excluding from the army such incompetent commanders as Essex. Remodelled army, which met and defeated Charles at Newbury and Naseby, 1645. Charles imprisoned; in 1649 trial conducted and sentence passed, Cromwell being one of the judges. On very day of execution a Council of State was appointed to carry on the government, and England was declared a Commonwealth. Draw from class that this was not pleasing to the nation, whose idea was a constitutional government, therefore confidence

in Cromwell began to decline. Power of the Government rested on the terror inspired by Cromwell. Tell class how, on king's death, Ireland declared in favour of the Prince of Wales, and draw from them the effect this would have on Cromwell. Tell of his behaviour in Ireland, and how he earned the hatred of the nation by his barbarous cruelty. Scotch likewise took up arms for Charles II., but Cromwell defeated them at Dunbar, 1650. A Scotch army invaded England, but was defeated at Worcester, 1651. Describe his dealings with the Long Parliament, which he finally expelled, and chose another, which was a failure, and finally resigned its powers to Cromwell. Then he became Lord-Protector and drew up "Instrument of Government," by which he provided that Parliament should be called every three years: to consist of 400 members for England, 30 for Scotland, and 30 for Ireland, and Catholics should be debarred from voting. Tell of his first Parliament, 1654. Draw from class how this Parliament disapproved of his absolute rule, whereupon Cromwell adopted Charles's plan of ruling without a Parliament. Point out his inconsistency in making use of the very plan he had so loudly condemned in the king. If not very popular at home, he was very successful abroad. Went to war with Spain to secure for England undisturbed trade with America, 1656. Called his second Parliament, and excluded 100 members. Remainder pressed him to take title of king, which he refused. Why? In 1658 a fever, brought on by anxiety and the cares of government, ended fatally. Draw from class what his closing years must have been. His acts of cruelty had made him many enemies, lived in constant fear of assassination, slept with loaded pistol under his pillow, haunted with superstitions owing to his guilty conscience. Died on his birthday, 3rd September, 1658, which was the anniversary of his two great victories of Dunbar and Worcester.

Draw from class his character: (1) His cruelty from his treatment of the Irish. Tell incident of his setting fire to church. (2) His unscrupulosity, shown in his treatment of the king. His words, "If I met the king in battle, I would

fire at him as at another". (3) His narrow-mindedness in wishing to enforce his Puritan notions on every one. (4) His tyranny, shown in his harsh rule on the declaration of the Commonwealth. (5) His ambition of power, shown in his dealings with those who opposed him.

Describe his appearance: Plain and awkward, usually dirty in his attire; a great contrast to Charles, with his refined manners.

Draw from class his good points: Energy and decision of character, shown in his disciplining of his army. Love of country, though perhaps not unmixed with selfishness. Taught the people to know their power, and caused name of England to be respected abroad. In his private life a good husband and father.

III. *Association.*

Draw from class that, though Cromwell succeeded in acquiring power, it did not make him happy, because not lawfully acquired.

IV. *Recapitulation*: When may Cromwell's public career be said to begin? Why did the battle of Marston Moor bring him into public favour? How did he treat the Irish and Scotch? With what result? What does this reveal to us of his character? What were the good points in his character?

LESSON ON THE GREAT FIRE OF LONDON (1665).

Class—Oxford Junior. *Time*—Three-quarters of an hour. *Previous Knowledge*—Great Plague. *Illustrations*—Picture of Old London; map to show part covered by fire. *Aim*—To exercise imagination of the class and interest them in the account of the Great Fire.

MATTER.

I. *Preparation.*

1. Question class on state of London at this period, Causes which made it unhealthy.

2. Compare slums of East London to-day and part called Old London.

3. Great Plague—its spread and destruction of 100,000 victims.

II. Presentation.

1. People just beginning to recover from shock of plague when fire broke out.

2. *Causes of Fire.* { (a) Outbreak in baker's shop, Pudding Lane.
(b) Spread owing to wooden houses.

3. *Description.* { (a) Flickering light seen over tops of houses.
(b) Feeble fire-engines of day.
(c) Increase of fire caused by wind.
(d) Panic of people. Church attacked.
(e) No need for rumour, fire announced itself.
(f) State of streets, fleeing families.
(g) 100 churches in ashes, 400 streets.
(h) Ordinary means useless, extraordinary resorted to.
(i) Raged four days, finally spent itself.

4. *Rumours as to Origin.* { Attributed to Catholics. Why? Cf. Nero. Inscription on Monument (name of station now). Pope says of it :—
"Where London's column pointing to the skies
Like a tall bully lifts its head and lies".

5. *Results.* { *Bad.* { Loss of fortune to many.
Ruin and starvation.
A blessing in disguise.
Good. { Rebuilding of streets. { Two years to clear away.
Original sites found.
Bricks used again.
Cleared away plague.
Sanitary conditions improved.
Generosity of Lord Mayor.

III. Association.

Compare Fire of London with that of Moscow. Contrast causes, effects and results as affecting the fortunes of England.

IV. Application.

A word on the great results that often spring from small causes, and events that often look like calamities are in reality blessings.

"There is some soul of goodness in things evil, would men but observingly distil it out."—*Shakespeare*.

V. Recapitulation.

Question on matter in points given; sketch outline on blackboard, as foundation for class to write an essay as home-work.

PROCEDURE.

I. Introduce lesson by questions on period. Who was reigning? What great calamity had taken place? What led to it? What was the state of London at this time? Compare with London of to-day. Is there any part still in a similar state? Old London. Show picture, and draw from class reasons for dire results. Question on Great Plague and the terrible destruction which it caused.

II. 1 and 2. Inhabitants just beginning to recover from this shock when the fire broke out. Began in a baker's shop in Pudding Lane. (Show position on map of London of to-day.) Why would houses burn easily? Why would fire be more liable to spread then? Cf. fires of to-day, speedily put out, and checked by material of buildings very often.

3. Here describe the fire as given by many historians. The appearance. Its increase by wind. The panic of people and the spread of the rumour. The streets of flame. The roaring of fire. The cries of the terrified multitude. Refer to fact that such occasions bring out true human nature in its worst and best sense. Cf. accounts of shipwrecks, where heroes and heroines are first discovered. Church attacked. The result. Means taken to stop it. Why

very feeble. *Cf.* engine of to-day. Let class suggest from cause of spread the only means of stopping it. Destroying the buildings to make a gap between flames. Slight success obtained. Fire continued for four days, and then spent itself. Picture the scene when all was over—the destruction, the loss of property, life, etc.

4. Then when all was quieting down again the usual question arose. What is this question? What does it lead to? (Rumour.) Who were held in disrepute at this time? *Cf.* Nero and Christians. Why could they not clear themselves? For how long had they been held in abhorrence? Refer to Monument, its appearance, where it stands, etc. Now a railway-station. The inscription, and Pope's lines about it. (Part of this was erased in late years.) What is general opinion now? *Cf.* Gunpowder Plot and modern ideas since State Papers have been open to the public.

Results.—Bad: Question class on loss to people in way of money. Fortune. Business. What part of city was it? What sort of people lived there? Can we see traces of it to-day in the way of *good* results? What had led to the plague? How could this be remedied now? Was it? Relate how it took two years to clear away rubbish from original sites of buildings, and some streets found and rebuilt. Some of old bricks used again. Result is city of to-day. St. Paul's rebuilt. Refer to generosity of mayor at the time, etc., and lead class to see that it really was a "blessing in disguise".

III. Compare with other great fires in cause and results. Moscow. What were some of great differences? But results to England.

IV. Close by drawing a lesson on the great results from little things in cases of both good and bad. *Cf.* origin of Penny Post, one kind act, etc. Ask class to quote some lines which teach us to find good in everything. Refer to stories which are founded on the Fire of London (Henty, etc., etc.).

V. *Recapitulate* and question on points given in matter, and set class, as home-work, to write an essay on subject.

LESSON ON THE PURITANS.

Class—Oxford Junior Grade. *Time*—Half an hour. *Previous Knowledge*—General outline of Tudor period. *Aim*—To impart accurate knowledge of the character of a sect which characterised England for so long.

MATTER.

I. Preparation.

Previous Religious Changes. { Henry VIII.
Edward VI.
Mary.
Elizabeth.

II. Presentation.

1. *Who they were.* { (a) Popular party in sixteenth and seventeenth century.
(b) Champions of religious liberty who desired *purser* doctrine: hence name.

2. *Their Rise.* { (a) Private judgment.
(b) Church not State should reform.
(c) Reaction from the Marian persecution.

3. *Tenets.* { (a) Holy Scripture guide in doctrine.
(b) Use of surplice, ring in marriage, sign of Cross, kneeling.
(c) No external ceremonies, all internal.

4. *Their History* :—

Elizabeth. { Brownists to Amsterdam on account of persecution.

James I. { Ask for freedom ; 1,000 clergymen.
Result: emigration of PILGRIM FATHERS,
1620.

Charles I. { Persecuted by Laud.
Parliamentary side. { Cromwell and Ironsides.

20,000 Puritans in ten years left on account of persecutions and prosperity in the Colonies.

Commonwealth. { Character lost between Independents and Presbyterians.

III. Association.

Compare with Lollards, difference of history on account of the temper of the people of England at the time.

IV. Application.

Their Influence. { 1. Manners and customs.
 { 2. Literature and stage.
 { 3. Commerce.
 { 4. History.

V. Recapitulation.

Summarise with points on blackboard, and question as to who the Puritans were. How they arose. Their doctrine. Their history during four reigns, and their influence on the times.

PROCEDURE AND QUESTIONS.

I. Begin lesson by reference to religious changes of Henry VIII. Cause of first great change. Original intention of first Reformers. In what sense did the Church need reform? Note tendency in all such cases to excess of zeal. Refer to Edward VI. and his advisers. The Book of Common Prayer. Was his father really a Protestant? Catholics and Protestants suffering side by side in his reign. What was the cause of this confusion? Finally, relate the bad effect of Marian persecution, the reaction of which led to a further excess of reform. The outcome was Puritanism.

II. 1. Who they were. Their idea of *purer* reform: hence name. Religion brought into everything, even their dress. Ask pupils name of some sects now who carry zeal to same extent. What was the attitude of people's minds towards interpretation of Scriptures? What would this naturally lead to? What is teaching of Catholic Church on this point?

2. What is the outcome of private judgment to-day? (Over 400 sects in England!) Relate the Puritan idea of reform, and how the Marian persecution had led up to this.

3. Doctrine guided by Holy Scripture. All outward signs done away with. (Here relate ceremonies, etc., which were abolished.) Refer to Catholic doctrine in this respect. Why externals necessary? Man made up of soul and body—one reacts on the other, even in all our passions, *e.g.*, outward signs of anger, etc., therefore necessary in religion, but of *no* value without internal sentiment. *Ex.*: Genuflexion, etc., in church. (Show illustration of costume, etc., of Puritans.)

4. Draw from class, by questions on period, the history of Puritans, beginning with Elizabeth. How they were persecuted. The emigration, resulting in foundation of our American colonies. *Mayflower*. They did so much good, and founded New England. James I.'s attitude. How did this coincide with his character? Charles I. Who was his great adviser? His attitude towards Puritans. Refer to Civil War. What celebrated army was raised at this time? What was the foundation of Cromwell's success with Ironsides? (Fight for religion.) *Cf.* the Boers. (Give some details about Ironsides, and show illustrations if possible.)

Do we hear much of Puritans after Commonwealth? What sects arose then? Puritan character lost between Independents and Presbyterians.

III. *Association*: As in matter.

IV. Recapitulate history briefly. Draw from class their influence on manners and customs. Why would these be so affected? Lead on to literature and stage. Who is the great Puritan poet? On what subjects did he write? The emigration would lead to progress. In what way? What good results have we now of the New England colonies? In what way have the Puritans influenced our history?

V. Recapitulate points in matter, and ask questions as given in matter; and, finally, contrast Quakers and Salvation Army, etc., of our own day with the Puritans.

NOTES OF A LESSON ON MONMOUTH'S REBELLION.

Class—Average age, 13. *Time*—Forty minutes. *Aim*—To exercise imagination and give class clear idea of the unsettled state of James II.'s reign.

MATTER.

I. Preparation.

A word or two on James II.'s religious opinions and how he behaved when he came to the throne.

II. Presentation.

- | | |
|---------------------------|---|
| 1. Cause of Insurrection. | { Opportunity afforded to rebellious spirits through the general dissatisfaction of people at James's religious views. |
| 2. Object. | { To place on the throne Monmouth, who had become very popular owing to his personal attractions and generous disposition. |
| 3. Leaders. | { (a) Earl of Argyll.
(b) Duke of Monmouth. |
| 4. Events. | { (a) Argyll kindled rebellion in Scotland.
(b) Monmouth landed at Lyme in Dorset, marched to Taunton and proclaimed himself king.
(c) Battle of Sedgemoor, 1685, in which Monmouth was defeated. |
| 5. Result. | { (a) Execution of Argyll and Monmouth.
(b) Confidence of James raised considerably. He set about schemes for securing ascendancy of Catholics.
(c) Ruin of many innocent persons. |

III. Association.

Compare with Wat Tyler's Rebellion in Richard II.'s reign.

Failure of Monmouth due to the inability of rebels to cope with a disciplined army.

IV. Recapitulation.

Questions as in procedure.

V. Application.

Point out evil effect of revolution on nations. *Cf.* French Revolution.

PROCEDURE.

I. Introduce lesson by questioning class on religion of the Stuarts. Tell them how James II. was inclined towards the Catholics, whom possibly he wished to gain for his ends. Let class say what would follow from this preference of James. Moreover, James had given his word that he would uphold the English Church.

II. 1. Point out that the nation was in a state of dissatisfaction, which seemed to afford an opportunity for a rising.

2. Tell class that two notable men, Argyll and Monmouth, a son of Charles II., were in Holland, whither they had fled because they feared the displeasure of James owing to their agreeing to the Test Act. Monmouth very popular.

3. Tell class how they agreed to create a rising—Argyll in Scotland, and Monmouth in England.

4. Argyll sailed from Holland, arrived at Orkneys on 6th May, 1685. Captured and executed. Monmouth had agreed to start six days later, but did not do so, in hopes that the bulk of the army being occupied with Argyll, England would be left unprotected. Landed at Lyme Regis; gathered a number of followers. Marched to Taunton, and proclaimed himself king. Followers amounted to 6,000 men; 1,000 horse—plough-horses chiefly. Draw from class what class of men these recruits were drawn from. Government apprised of movements of the rebels. Militia sent out against them. Royal troops encamped at Bridgewater. Monmouth descries them from top of a steeple. Plans a night attack. Advance in dead silence. Accidental pistol-shot reveals their presence. Refer to same incident at the Modder during the Transvaal War. Royal troops immediately on

alert. Desperate fighting. Memorable battle of Sedgemoor, 1685. Last battle fought on English soil. Monmouth fled when he saw his cause hopeless. Followers fought until all perished. Monmouth found hiding in a ditch, taken and executed.

5. Point out how elated James was after the victory, which he attributed to his own abilities. Show how he set all manner of schemes on foot in favour of Catholics, and this did not tend to make him more popular with the nation at large. Point out how this rebellion enraged the partisans of the king, who inflicted unheard-of cruelties on many innocent persons, as well as on those who had taken part in the rebellion.

III. Compare this rebellion with Wat Tyler's with regard to the class of men forming the rebel ranks. Show how the victory over rebels in each case was due to the existence of a standing army. Although the insurgents fought with great bravery, they were overpowered by the trained and disciplined army.

IV. What was the cause of this rebellion? Its object? Mention some of the events during the rebellion. Why did it fail? How did it end? What result did it bring about?

V. *Application*: As in matter.

NOTES OF A LESSON ON THE TRIAL OF THE SEVEN BISHOPS.

Class—Age, 16 years. *Time*—Forty minutes. *Aim*—To exercise imagination of class and give them a clear idea of the unsettled state of James II.'s reign.

MATTER.

I. Preparation.

Difficulties	be-	}	1. Religious.
tween	James		
and			
Nation.			
			2. Dispensing power.

II. Presentation.

- | | | |
|-------------------------------|---|---|
| | { | (a) Declaration of Indulgence, 1687. |
| | | Object. { By giving liberty of conscience to all, to win Catholics and Puritans to his side against Protestants. |
| 1. Events leading to Trial. | | (b) King's attempt to force Universities to elect Catholics proposed by him. Steady resistance offered. |
| | | (c) Second Declaration of Indulgence, 1688.
Swept away penal laws, religious tests, etc., and removed hindrances to State or military appointments. |
| | | (d) King's order to read Declaration in church on two successive Sundays. |
| | { | Only four out of about 100 ministers complied. |
| 2. Resistance to Declaration. | { | At Assembly in Lambeth Palace, petition drawn up by Primate Sancroft to the effect that king had no power to dispense with the laws in Church matters. Signed by Lloyd, Turner, Lake, Ken, White and Trelawney.
Petition presented by them in person; dismissed in disgrace.
Petition circulated in coffee-houses. Public feeling for the bishops heightened by birth of an heir. |
| Trial. | { | Imprisonment in Tower; tried before King's Bench for libel. Two judges for, two against them. Jury's verdict "Not guilty," after hours of consultation. Unprecedented enthusiasm of people on hearing the news. |

4. Results. {
- (a) The trial a landmark in history of the Constitution amounting to a denial of king's power to dispense with laws.
 - (b) Invitation to William of Orange to take possession of English throne.
 - (c) Indirectly strengthened Protestantism and made religious toleration farther off than ever.
 - (d) Flight of James.

III. Association.

Compare with Charles I.'s tampering with Parliament. Arrest of five members and triumph of people at Charles's failure. Civil War immediate result.

James's "Dispensing Power" outgrowth of Tudor despotism and James I.'s and Charles I.'s "Divine Right"

IV. Recapitulation.

Questions on above as in procedure.

V. Application.

Class to answer in writing for next lesson the following questions:—

1. What events led up to the trial of the bishops?
2. What were the results of this trial?

PROCEDURE.

I. Introduce lesson by recalling to class Argyll and Monmouth's insurrection. Show how confident James became after Sedgemoor, and tell class that this confidence led him to aim at two things. Draw from class what these two ends were—(1) To make himself absolute; (2) to restore Catholic religion. Cf. James with Charles I., who was likewise apt to attribute any prosperity in nation to his own power and good government. Refer to Stuarts' idea of the "Divine Right," and show class how James exasperated the nation by claiming the "Dispensing Power". Judges, fearing

to be turned out of office if they dissented, sided with the king, although against their conscience. James then began to fill chief offices of Church and State with Roman Catholics. What effect had this on nation? Point out to class that it was perfectly natural that the people should be incensed. Meantime Louis XIV. revoked Edict of Nantes, and thousands of French Protestants took refuge in England. Let class point out what effect their coming would naturally produce on nation.

II. 1. Point out that James, seeing people against him, wished to make friends and allies for himself. Why was it useless to look to the Protestants? Let class say what other denominations there were besides Church of England. What is the general name for these? To these James turned, and, in order to win their favour, issued a "Declaration of Indulgence," by which he permitted liberty of conscience to all. Let class say how they would expect this "Declaration" to be received. Show how, contrary to James's expectations, the Nonconformists, as a whole, declined to avail themselves of it. Draw from class the reason for this, *i.e.*, because they saw that James merely wished to use them as tools in getting absolute power. Point out that the effect of the "Declaration" was to increase the displeasure of the people. Then James made an attack on Universities. Members refused to elect Catholics, therefore turned out. In 1688 the king issued a second "Declaration," simply to show that his mind was unchanged on the subject. No one paying much attention, king ordered it to be read in every church on two successive Sundays. This "Declaration" swept away penal laws, etc.

2. Out of about a hundred ministers four complied; rest presented petition signed by Sancroft and six other bishops. This petition was presented by them in person, but they were dismissed in disgrace, and committed to Tower. Tell how the petition was rapidly circulated, and show how its effect was to turn the sympathy of nation to the bishops. Before trial came on a son was born to James. Draw from class what effect the birth of an heir was likely to have on

people. Show how they declared it to be untrue. Here recapitulate events which led up to trial.

3. Tell class that, after a week's imprisonment, bishops were brought to King's Bench to be tried for libel. Date fixed for 29th June, and then bishops liberated on their own sureties. Describe feeling of people when 29th dawned. King's Bench filled in every corner. Crowds clustered in every space to hear the verdict. Nearly every one on the side of the bishops. Show how this want of sympathy ought to have opened James's eyes to his unconstitutional method of government, but that it did not. Contrast way in which nation now rallies round sovereign who considers its interests in everything. Four judges present—two for king, two against him. Charge brought against bishops was the writing of a false and malicious libel. Speeches made for three hours. Two judges said "A libel," two said "No libel," these last boldly declaring that the "Dispensing Power" was unlawful. All night jury were up without food. One brewer refused to decide against king for fear of ruin. When at last he was overruled by a certain country squire, a verdict of acquittal was pronounced about six o'clock in morning. Describe feelings of nation at the news. London said to have gone mad with delight.

4. Draw from class results of trial:

(a) Landmark in history. Show how powerful nation was growing to be able thus to denounce king's assumed power.

(b) Nation despaired of getting its rights from James, therefore, driven to desperation, resolves on choosing another sovereign. William of Orange invited over.

(c) Protestants strengthened and religious toleration made further off than ever. Refer to Catholic Emancipation Act, 1829.

(d) Flight of James.

III. Compare James's conduct with that of Charles I., who was continually tampering with his Parliaments. What was the result of Charles's tyranny? James's likewise led to revolution.

Lead class to see that James possibly meant well in wishing to secure liberties for Catholics, but he did not work it in the right way, and so only exasperated his Protestant subjects without benefiting his Catholic ones. Cf. Mary Tudor.

Show also that his "Dispensing Power" was the outgrowth of Tudor tyranny and inherited ideas about the "Divine Right," and that allowances must be made for his surroundings.

IV. Question in following or similar manner:—

1. What was the "Declaration of Indulgence"?
2. What was its object?
3. What did it lead to?
4. What was the bishops' opinion about this "Declaration"?
5. Give a short account of the trial of the bishops.
6. What were the results of the acquittal of the bishops?

V. *Application*: As in matter.

NOTES OF A LESSON ON WAR OF SPANISH SUCCESSION.

Class—Average age, 15. *Time*—Forty minutes. *Aim*—To give class a clear idea of the events which led to this war and the part played by England in it.

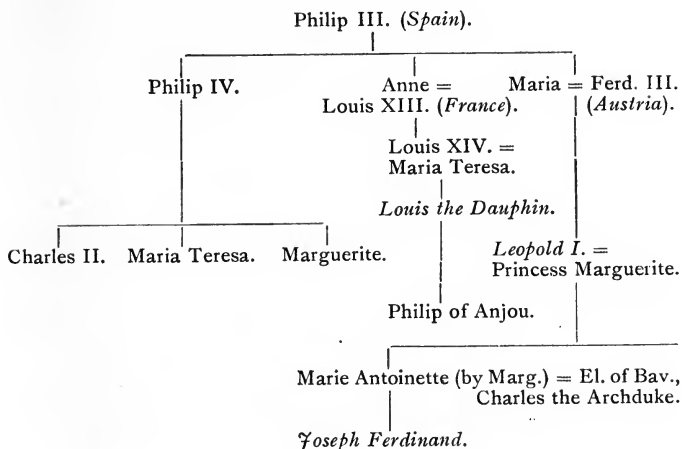
MATTER.

I. Preparation.

A reference to the Peace of Ryswick, showing why Louis XIV. had been obliged to accept its terms, *i.e.*, need of preparing for a new and greater struggle. Charles II., King of Spain, was dying, and with him ended male line of Austrian princes, who for 200 years had occupied Spanish throne.

II. Presentation.

Table showing the Claimants to Throne.



Summary of Table : Three claimants to throne : Louis the Dauphin ; Joseph Ferdinand, grandson of Charles II.'s youngest sister ; and Leopold the Emperor, a son of Charles's aunt. Claim of last really the strongest, because that of the other two was barred by Treaty of Pyrenees.

Difficulties attending the Succession. { If Louis the Dauphin succeeded, France would become too powerful for the interests of Europe. If the Emperor succeeded, Austria would become too powerful. William III. wished for the succession of Joseph. Union of Spanish colonies with France most feared.

Partition Treaties. { First, in 1698 in favour of the Electoral Prince ; Spain ceding its Italian possessions to Louis and the Emperor.

Partition Treaties.	Second, in 1700; Spain, Netherlands and Indies assigned to second son of Emperor, Charles Archduke of Austria. Emperor protested and refused to join in treaty, but if he persisted in his refusal his share was to pass to some unnamed prince. Final arrangement by Peace of Utrecht, 1713.
Circumstances altered by action of Charles II.	Charles II., worried by the different factions, made will in favour of Philip of Anjou, grandson of Louis XIV. He came to Spanish throne on condition of renouncing all claim to French throne.

III. Association.

Compare with Hundred Years' War.

IV. Recapitulation.

As in procedure.

PROCEDURE.

I. Introduce lesson by referring to Peace of Ryswick, and let class say what the clauses were. From what class know of Louis XIV. let them say whether he signed it willingly. Point out how he had been almost forced to sign it, not only because France had suffered from the war with William III., but also because he saw a storm gathering in another quarter which needed all his strength. Point out how Spain had been at one time very powerful. Proof of this in the planning of the Armada. Tell how it had declined and lost much of its brilliance, yet still had enormous resources, and the extent of its empire very vast—possessions in Old and New World, Naples, Sicily, Netherlands. Only a vigorous ruler was needed to restore its former glory. Tell class that the Spanish king, Charles II., was dying, and a difficulty arose as to his successor, since he had no children.

II. Put the table on the blackboard, marking the three claimants in coloured chalk. Let class say which of the

three had the best claim by descent. 'Tell them of the marriage treaties by which Louis the Dauphin and the Elector Joseph were debarred, so that there remained the Emperor, who really, in strict law, had the best claim.

Let class say what difference would be made to France by the Dauphin's accession to the Spanish throne. William was as resolute in repulsing claims of Emperor as those of Louis.

It became necessary to bribe the two rival claimants, Louis and the Emperor, to waive their claims, and the succession of the Electoral Prince was recognised by the First Partition Treaty between England, Holland and France, 1698, on condition that Spain would cede its Italian possessions to his two rivals. Thus the Milanese would pass to the Emperor and the two Sicilys to France. Treaty hardly concluded when a fresh difficulty arose from the death of Joseph Ferdinand, the Electoral Prince. Show how France and Austria were now face to face, and what success of either would entail. Point out how great danger England was in. The army and navy had been reduced; the people wished for peace, and William could not back his policy by arms. Second Partition Treaty in 1700. Spain, the Indies and the Netherlands to go to the Archduke of Austria, Charles, second son of the Emperor.

Spaniards much averse to the dismemberment of the monarchy, and the various factions succeeded in wresting from Charles II. a will bequeathing all his dominions to Philip of Anjou, a grandson of Louis XIV. Louis XIV. hesitated to accept this. Point out to class his reasons: (1) Recency of Partition Treaty, and (2) the great risk to himself. His fears, however, were overruled by the conviction that William III. could offer no opposition, owing to the peace policy of Government. Every one seemed to prefer this arrangement to the Partition Treaty. Point out how William was angered at Louis XIV.'s breach of faith, but that he had no means of punishing it. Why not? In 1701 Philip peaceably entered Madrid, and Louis proudly boasted that there were no longer any Pyrenees. Final act

of Louis which hastened the war was his promise to James II., who lay dying at St. Germain, to acknowledge the old Pretender King of England, Scotland and Ireland. This promise amounted to a declaration of war, and in a moment all England was at one in accepting the challenge.

III. Compare with Hundred Years' War as to causes and results.

IV. *Recapitulation* :

1. Who were the three claimants for the Spanish throne at death of Charles II. ?

2. Which had the best claim ?

3. What difficulties were in the way of their succession ?

4. Who did William III. wish should succeed ?

5. What arrangement was first agreed upon ?

6. How was this frustrated ?

7. What agreement was then made ?

8. How was this arrangement upset ?

9. Did the different parties agree to the succession ?

10. On what condition ?

11. What was the final act of Louis which amounted to a declaration of war ?

BATTLE OF TRAFALGAR (1805).

Class—Average age, 16. *Time*—Three-quarters of an hour. *Aim*—To exercise the imaginations of the class and lead them to be interested in "The deeds that have won the Empire".

MATTER.

I. Preparation.

- | | | |
|-----------------------------------|---|---|
| 1. <i>Remote Cause of Battle.</i> | { | <p>(a) Napoleon's plan for conquest of England.</p> <p>(b) Camp at Boulogne. "Give me the channel for twenty-four hours."</p> <p>(c) Decoy of Nelson to West Indies. Villeneuve from Toulon, Gravina from Spain—unite. Nelson drawn to Orinoco. Return of French and Spanish, but chased by Nelson.</p> |
|-----------------------------------|---|---|

II. Presentation.

1. Immediate Causes.

- (a) Villeneuve and Gravina encountered by English fleet under Calder at Finisterre; two Spanish ships taken. Villeneuve anchored in Cadiz and spoilt Napoleon's plans.
- (b) Collingwood kept him trembling by signalling to an imaginary fleet.
- (c) News of Villeneuve's retreat reached Nelson who had returned home to Merton for rest. Hastened to Pitt to announce intention of destroying allied fleet. After a fortnight was within easy sail of Cadiz.

2. The Two Fleets.
- | | | | |
|---|---------------------|--------------------|--------------|
| { | (a) <i>French</i> | { 33 sail of line. | } Villeneuve |
| | and | 5 frigates. | |
| | Spanish. | 2 brigs. | } Gravina. |
| { | (b) <i>English.</i> | 27 first rates. | |
| | | 4 frigates. | |
| | | 1 schooner. | |
| | | 1 cutter. | |

3. The Battle.

- (a) Before.
- | | |
|---|---|
| { | i. Nelson hid behind Cape St. Mary, twenty leagues west of Cadiz, watched as a "cat watches mice". |
| | ii. 19th October, Villeneuve stole out. Fleet sighted by Nelson off Trafalgar, on 21st October, twenty miles off. |
| | iii. Position of English fleet—two columns at right angles to enemy, who were in crescent shape. Columns led by <i>Victory</i> and <i>Royal Sovereign</i> , under Nelson and Collingwood. |

Plan of Battle (sketched on blackboard in coloured chalks while lesson is proceeding).

(b) *During.*

- i. Famous signal, "England expects every man to do his duty," *i.e.*, not wait for signal but reserve fire till alongside of enemy's ships.
- ii. French opened attack by trying range with a few shots.
- iii. Collingwood broke line and engaged in duel with *Santa Anna* and *Fougueux*; surrounded by five vessels at once, but four soon turned to defend themselves.
- iv. Nelson then directed his ship to the horn of the crescent towards *Cadiz*. Attacked *Santa Trinidad*, and was surrounded as Collingwood, but no cannon was let off till he reached *Bucentaur*, where Villeneuve was supposed to be, and which soon swung like a log on the rolling sea.
- v. *Victory* and *Redoubtable* got rigging entangled. Nelson's uniform attracted eye of musketeer on mizzen-top of French vessel, and he aimed the fatal shot which pierced through epaulette, shoulder and spine. He died three hours after, but heard the cheers of victory.
- vi. Nineteen ships of the line had struck the French or Spanish flag.

(c) *Results.*

- i. French fleet destroyed and English once more masters of the ocean.
- ii. Effect on Pitt—new lease of life. On country in general.
- iii. Effect on Napoleon—"I cannot be in two places at once".
- iv. Honours paid to memory of Nelson—Trafalgar Square.

III. Association.

Compare with victories of the Nile and Copenhagen. Nelson's position in each, and results of each to England.

IV. Recapitulation

Of causes and account of battle. Scheme on blackboard to be filled in, and given as notes, on which pupils are to reproduce in their own words an account of the battle.

PROCEDURE.

I. Introduce lesson by questions on history of period and Napoleon's last attempt on England. What were his plans? How did he begin to carry them into execution? What did he say boastfully? Nelson was decoyed to West Indies, but not for long. His genius recognised the idea of Napoleon at once, and he turned to chase the Spanish and French vessels to Europe. Their encounter off Spain, and Nelson's return to Merton. Home for a rest.

II. 1. Give account of the adventures of the Spanish and French fleets on their way to join Napoleon. Trace on map. The defeat suffered, and what Villeneuve was obliged to do. Napoleon's action. (Compare usual behaviour on such occasions.) Cleverness of Collingwood in keeping Villeneuve in trembling till further help came from England. Why was this a good plan? How do you think Nelson would receive the news of such an opportunity? He forgot his own need of rest, his weak health, etc., and begged to go, and within a fortnight was within easy sail of Cadiz. (Show map of Spain and position of fleets.)

2. Describe the two fleets, the number of vessels each possessed, the style of vessels, and show famous picture of some of them. Compare state of fleets and condition of leaders. When victory seemed secure, and when not. What do we know of Nelson's tactics in former battles of 1798 and 1801? Why was he always successful? What kind of fighting did he dislike? and why?

3. (a) *Battle*: Describe how Nelson watched for his prey. His action when Villeneuve at length crept out of

Cadiz. (Sketch on blackboard.) Describe the positions taken up by opposing fleets. Spanish in crescent. (Cf. Armada.) Nelson and Collingwood two columns at right angles to crescent. Their plan of attack. Why was this course likely to be successful?

(b) *During*: Refer to famous signal. What it meant. What Nelson had first suggested, and who advised the change to "England expects". What was this duty? Why was it a hard duty to reserve fire? (Cf. Waterloo and Wellington.) Here describe the battle according to points given in the matter. Give details as to behaviour of the men on the *Victory* and the *Royal Sovereign*, the encounter of the ships, etc. Show picture of battle by Stanfield. Why was it possible for rigging to get entangled in those times? Compare ships of to-day. How Nelson received his death wound: a chance shot. How the man who aimed the fatal shot was treated by the English. Describe the last moments of Nelson, and show picture of the death. Its effect on the men. How Nelson had tried to avoid letting them know of his danger. Draw from class other cases where the hero has lost his life in his greatest achievement.

(c) What would the result of such a victory be to England? When would she have secured her power? Why? Who would be especially glad to get the good news in England? How did the people receive it? Why was the joy mingled with sorrow? Tell account of news brought to Napoleon; his answer, so characteristic of the man. Draw from class the national honours paid to Nelson. Where is his tomb? Where are monuments to him? etc., etc.

III. Compare the victory with those of Nile and Copenhagen. How Nelson was not really in command in either of these, but his superior officers were noble-minded enough to give place to his genius. The results to England.

IV. What were the immediate causes of the battle? Who were the chief leaders? Explain the plan of attack. How did the men obey the signal? Why was this such an important victory? What were its results to England? to Napoleon? etc., etc.

NOTES OF A LESSON ON THE PHYSICAL FEATURES OF SWITZERLAND.

Class—Average age, 16 years. *Time*—Forty minutes. *Aim*—To exercise reasoning powers of class in connecting cause with effect.

MATTER.

I. Preparation.

Position and Boundaries.	{	Centre of Europe. Bounded on north by Germany, south by Italy, west by France, east by Austria.
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II. Presentation.

- | | | | | | | | | |
|--------------------------|---------------------|---|--------------------------|---------------------|---|--------------------------|---|---|
| 1. Relief. | { | <p>(a) Surface elevated.</p> <table border="0"> <tr> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="vertical-align: middle;">Country consists of</td> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="vertical-align: middle;">Two ranges of mountains.</td> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="vertical-align: middle;"> <p>i. Central Alps, filling up S.E. and N.E., or $\frac{4}{7}$ of whole.</p> <p>ii. Jura Mountains, stretching from S.W. to N.E., $\frac{1}{7}$ of whole.</p> </td> </tr> </table> <p>A plateau 100 miles long and 12 broad, situated between the two ranges and occupying $\frac{12}{71}$ of whole.</p> | { | Country consists of | { | Two ranges of mountains. | { | <p>i. Central Alps, filling up S.E. and N.E., or $\frac{4}{7}$ of whole.</p> <p>ii. Jura Mountains, stretching from S.W. to N.E., $\frac{1}{7}$ of whole.</p> |
| { | Country consists of | { | Two ranges of mountains. | { | <p>i. Central Alps, filling up S.E. and N.E., or $\frac{4}{7}$ of whole.</p> <p>ii. Jura Mountains, stretching from S.W. to N.E., $\frac{1}{7}$ of whole.</p> | | | |
| 2. Rivers. | { | <p>Switzerland has the sources and upper courses of many rivers; generally unnavigable.</p> <p>Most of them take their rise in glaciers: hence well supplied.</p> | | | | | | |
| 3. Lakes. | { | <p>Numerous and important, lying in the outer valleys.</p> <p>Chief: Lucerne, Geneva, Zurich, Constance.</p> | | | | | | |
| 4. Climate and Rainfall. | { | <p>Severe in winter owing to great elevation. Alps in south so high as to exclude mild southern winds. Northern district open to cold north winds.</p> | | | | | | |

4. Climate and Rainfall.

Summer very hot in lower valleys on account of depth and narrowness. Summer rainfall and melting of the snows cause country to be well watered.



SWITZERLAND (RELIEF).

III. Association.

Compare with Italy with regard to

1. Relief.
2. Climate, and consequent effects on
3. Habits of people.

IV. Application.

Class to deduce effects of surroundings on	$\left\{ \begin{array}{l} 1. \text{ Products.} \\ 2. \text{ Manufactures.} \end{array} \right.$	$\left\{ \begin{array}{l} \text{Half country too high for cultivation. Chief product of soil is hay: hence cattle-rearing.} \\ \text{No coal nor iron, yet important owing to the utilising of the water supply. Cf. Holland.} \end{array} \right.$
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Class to deduce effects of surroundings on	3. Occupation of people.	Large portion of them herdsmen, therefore simple and frugal. Country offers no great resources, therefore people turn all to account.
	4. Character of people.	Possessed of great sense of beauty and love of Nature; bold, hardy, thrifty; lovers of independence.

V. Recapitulation.

Question on matter as in procedure.

PROCEDURE.

I. Introduce lesson by questioning class as to position and general character of Switzerland. Show on map the countries touching it.

II. What can be said of general elevation of country?

What is the chief mountain system of Switzerland?

Let class give the names of these Alps from their position. "Central Alps," portion occupying Switzerland. "Western Alps," stretching from north-west of Apennines to Mont Blanc. "Eastern Alps," extending from Bavaria to North Italy, and from borders of Switzerland to Northern Plain. Let class say what proportion the Central Alps occupy. They are situated on each side of Rhone valley, more northerly known as Bernese Oberland. Contrast Matterhorn with Jungfrau. Second system of mountains—the Jura—much less striking in appearance than the Alps. Point out on map the plateau lying between the two ranges of mountains. Numerous outlying spurs stretch from the Alps and Jura into this tableland. Slope of both systems abrupt towards south and long towards north and west. Let class point out effect of this on appearance, *i.e.*, mountain summits more striking seen from the Italian than from the Swiss side.

III. Contrast relief with Italy. Latter has great plain in the north, and the peninsula is occupied by the Apennines, which have lowlands on each side.

What is determined by the slope of a country?

Why are the rivers of Switzerland of little use?

Where do they take their rise? What effect has this on them?

Show on map how Mont St. Gothard forms a kind of knot in which numerous branches of the Alps meet, and here are the sources of four great rivers, *viz.*, Rhine, Rhone, Reuss and Ticino, going off in different directions. Note the Falls of Schaffhausen. Rivers are closely connected with the lakes, which are noted for their number, their size, their beauty and their depth.

Draw from class the use of these lakes.

Rhone on account of its rise in a glacier is muddy and troubled at its source, but on leaving Lake Geneva it is a clear blue stream, therefore the lake serves to purify it.

What effect has the melting of the snows on the volume of a river? When a river enters into a broad lake what of its waters? (*Cf.* Gulf Stream.)

What of the volume of the river on leaving the lake? Decreased.

What advantage is there in this? Inundations prevented.

Owing to the elevation of the country, what can be said of climate?

The lower valleys being deep and narrow, what kind of climate may we expect in winter? in summer?

How does the climate differ from that of Italy?

IV. Draw from class the effect of this climate on products, etc.

Products : Half country too high for cultivation; a little less than half is under grass. What occupation follows in a country where there is an abundance of grass?

What do the products of a country determine? Manufactures.

Grass being the chief product results in the rearing of cattle. What manufacture follows from this?

What should we expect of the manufactures of a country possessing no coal nor iron.

Manufactures of Switzerland important notwithstanding. Draw from class there must be something which enables her to carry them on.

By what means other than steam can machinery be worked?

What must be character of stream which works a mill?

Has Switzerland any rapid torrents? Why?

Here compare with Holland, another country carrying on important manufactures without coal or iron.

Can Holland make use of water for machinery like Switzerland? Why not?

Tell class that Holland makes use of the regular winds, which work numerous mills. If possible, show class a picture of typical scene in each country.

Draw from class the occupation of number of people since cattle-rearing is carried on. How does this kind of life affect their character?

What effect has the lack of resources on the people? Makes them thrifty.

What effects have the surroundings on the character? Mountains make them bold, hardy lovers of independence. Cf. mountaineers of Scotland. * Natural beauty of their country fosters in them a love of the beautiful.

V. *Recapitulation* : How is the country divided? Why are the summers hot? Why are the rivers of little use for navigation? How is it that Switzerland is prosperous in her manufactures? How are the occupations and character of people affected by the nature of the country?

NOTES OF A LESSON ON WINDS.

Class—Oxford Juniors. *Time*—Three-quarters of an hour. *Previous Knowledge*—General notions as to distribution of temperature over earth's surface. *Aim*—To interest class in causes of natural phenomena.

MATTER.

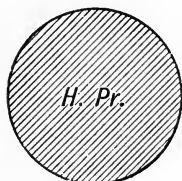
I. Preparation.

A few questions as in procedure to elicit the definition "Air in motion".

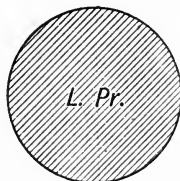
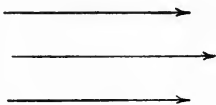
II. Presentation.

I. Cause of Winds.

- | | | |
|--|---|---|
| (a) Difference of pressure in air owing to | { | Unequal heating. |
| | | Varying amount of watery vapour. |
| (b) Movement of air to obtain equilibrium. | { | Flows <i>from</i> region of high pressure to region of low pressure <i>spirally</i> . |



REGION OF HIGH PRESSURE.



REGION OF LOW PRESSURE.



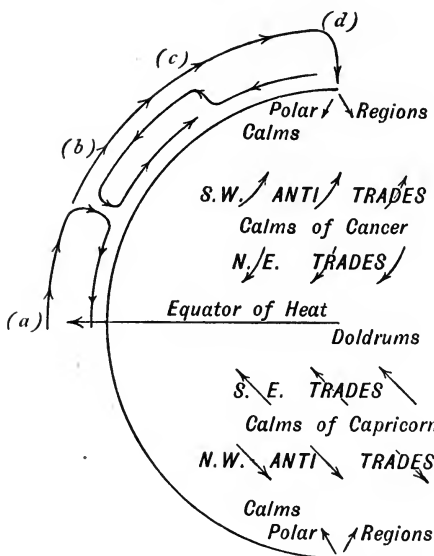
IN-DRAUGHT AND OUT-DRAUGHT.

Candle flame at top and bottom of an open door into a warm room from a colder hall.

2. Direction.

What determines general direction.

- i. Unequal heating of tropics and polar regions.
 - ii. Unequal heating of land and water.
- General circulation through zones.
- Causing: Alternation of { By day and night.
land and sea breeze. { By seasons.



i. Ascending current heated lighter air.

ii. Descending current cooled heavier air.

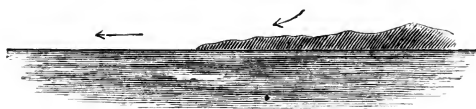
iii. Ascending current heated air.

iv. Descending current cold heavy air.

DIAGRAM OF DIRECTION OF WINDS.



SEA BREEZE BY DAY.



LAND BREEZE BY NIGHT.

3. *How the direction of a wind is changed.*

- (a) By shifting of situation of greatest heat. } See change of monsoons.
See steadiness of Trades over ocean.
- (b) In a fixed cycle. } In *N. hemisphere* from N. through E.
and S. to W.
In *S. hemisphere* from N. through W.
and S. to E.



DIRECTION IN N. HEMISPHERE.

DIRECTION IN S. HEMISPHERE.

III. Application and Association.

As described in procedure while teaching above.

IV. Recapitulation.

For questions see procedure.

PROCEDURE.

I. Open lesson by picturing for class a large room in mid-winter in which there has been no fire, though there is a fire laid at one end. Elicit facts that (a) it is equally cold in all parts, (b) *that there is no draught*; but when fire lighted if we sit near it at first experience tells us that it is the most draughty place; or if room *very* warm on cold day, and go to open window, which way is air moving? If passage cold and room warm and you open door, what result? What is the name people give to these movements of the air? *Draughts*. They are artificial and small winds, for by a wind we simply mean *air in motion*. Lastly refer to fact that in a house *equally* heated within and well sheltered from outside air there would be no draughts.

II. This brings us to the chief part of our lesson, which is to find out the *cause* of winds. If they are only large draughts they will be caused by same reason, and that we found to be *unequal heating*. We have now to find *why* this should cause air to move. What is effect of heat on gaseous bodies? If I have a vessel full of air and heat it, what effect on air? But we have learned gases like liquids press in all directions equally if sum total of atoms is less than sum total of pressures, therefore effect of heat is to alter pressure. Remind class that *unequal* heat is the point to which they must direct their attention. Given two air masses at same temperature, we have same pressure; heat differently—result?

Refer to water; vapour lighter bulk for bulk affects pressure.

Elicit from class desire of gas *for equilibrium*; refer to the spread of house gas all over room equally. The dissemination of odours will illustrate same principle.

Draw two areas of pressure. Ask a few questions as to the *direction* of draughts. Do the experiment with candle and elicit that the *movement* to restore equilibrium is *from* the region of high to the region of low pressure. Give other areas from map.

Proceed next to *apply* and *associate* same idea to the explanation of land and sea breezes in the explanation of *why* they blow and change at stated intervals. Draw the diagram on p. 138 (Direction of Winds), and describe the circulation of the air currents from Equator to Poles and back again in search of equilibrium. Only refer very briefly to the fact that the earth's rotation affects direction (this should form subject of another lesson). Conclude by referring again to land and sea breezes, and from them deduce reason of change of *monsoons*. If time permit show the cyclic movement of wind by a diagram on blackboard.

III. *Application and Association*: As in matter.

IV. 1. Define wind and say how it is caused.

2. Explain why on a cold day there is a draught inwards from the window of a warm room.

3. Where do the Trade winds really originate?
4. Why do the Polar winds creep along on the surface of the earth?

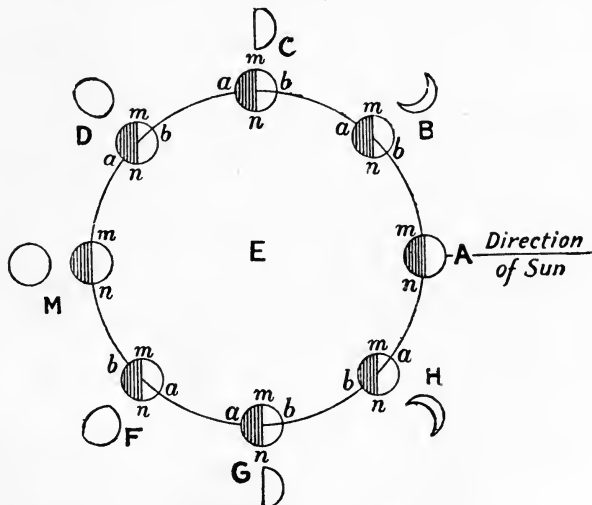
NOTES OF A LESSON ON THE PHASES OF THE MOON.

Class—Age, 14 to 16 years. *Time*—Three-quarters of an hour.
Illustrations—An orange and blackboard sketches. *Aim*—To exercise the judgment and excite interest in Nature, and thus stimulate the class to inquire into.

MATTER.

I. Preparation.

1. *Meaning of Term.* { (Gk. *phasis* = an appearance).
The different appearances presented to the earth by the moon.
2. *Rotation of Moon.* { It makes a complete revolution round the earth in 28 days, i.e., a lunar month.



THE PHASES OF THE MOON.

E is the position of the Earth. The eight small circles represent the chief positions of the Moon in its orbit, and the figures outside them represent the corresponding phases.

II. Presentation.

1. Explanation of Diagram.

(Blackboard in coloured chalks.)

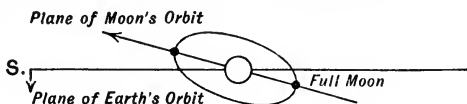
- (a) Large circle, moon's orbit.
- (b) Small circles on it, *transverse* section of moon, shaded to show its illumination by sun's rays in different positions, now the lunar circle of illumination.
- (c) Letters *a* and *b* mark how much of moon illuminated and non-illuminated is seen at E.
- (d) Outer figures show the appearance it presents in each case as seen in longitudinal section.

2. The Phases.

- A New moon or no moon.
- B Crescent (*cresco* = I grow).
- C First quarter.
- D and F Gibbous (*gibbus* = a hump).
- M Full moon.
- G Last quarter.
- H The old moon (half).

3. Why full moon is not always eclipsed.

Inclination of plane of moon's orbit—



III. Association.

Questions in procedure.

IV. Summary and Recapitulation.

The phases of the moon are caused by the varying amount of illuminated surface visible to the earth during its rotation round that body.

V. Application.

1. How to know when it is first or last quarter.

2. Popular notions connected with Phases of the Moon.
- (a) Change of weather with change of quarter.
 - (b) Effect of full moon on lunatics.

PROCEDURE.

I. Introduce by asking what changes we perceive in the moon from week to week. Ask what these are called, and give derivation. Whence does the moon derive its light? What motions has it? Contrast with those of the earth. What is a lunar month?

II. 1. Draw diagram on blackboard. Ask how much of moon's surface is illumined by sun; put in dark shading. These represent how the moon would appear as seen from the heavens. As seen from the earth, E, draw from class that only *a*, *b* can be seen, and of this only the part *n*, *b* is illuminated. Next take half a peeled orange to represent the half of the moon turned towards E. Ask how much would be illuminated in position A—none. Now in B. Show that the section *n*, *b* would appear in longitudinal section like one flake; in like manner at C it would represent quarter of whole orange, which looks at a distance like a semicircle. The appearance at D can be represented by the half orange minus two flakes. In like manner elicit the other appearances.

2. Repeat order of movement, asking names given to each. Give derivations, drawing from class meaning of crescent and gibbous, as applied to the moon.

3. Refer again to diagram, and show that if the orbit of the moon were in the place of the sun and earth, how much then would be illumined at M (eclipse). If then on contrary we *do* see the full moon, what must we conclude? Elicit 3, and draw diagram showing moon's inclined plane, and illustrate further by tub of water, balls for earth, moon and sun (*pl.* of water = the plane of ecliptic).

IV. After giving summary, recapitulate. What is a lunar month? When do the following phases occur: Full moon? New moon? Last quarter? Crescent? Gibbous?

V. 1. Ask what letter is formed by producing the diameter of first quarter (*p*); connect it with premier (first). In like manner last quarter (*d*), and connect it with dernier (last).

2. Draw from class popular ideas (*a*) and (*b*); ask

what has given rise to (a), and if there are any scientific grounds for it. Prove not, by showing that the change is very gradual. In case of (b) show connection in derivation ; tell class it is a disputed question.

NOTES OF A LESSON ON TIDES.

Class—Age, 14 to 16 years. *Time*—Three-quarters of an hour. *Previous Knowledge*—Currents and winds, also elementary idea of gravitation. *Aim*—To lead class to reason by connecting cause and effect and to give accurate notion of the subject-matter.

MATTER.

I. Preparation.

1. Ordinary signi-
fication of
term "Tides". { Rise of ocean = flood,
and
Fall of water = ebb.
2. Where seen. { At sea-shore.
At mouths of some rivers.
3. When : Twice each day.

II. Presentation.

- I. Causes. { (a) Pull of moon or force of gravitation
to moon.
(b) Effect on solid earth and on water.
(c) Difference of this effect on side under
moon and on remote side.

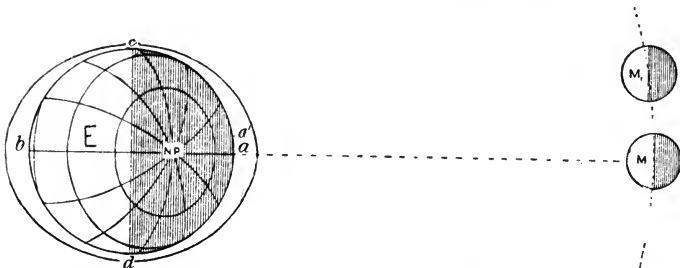


DIAGRAM TO ILLUSTRATE GRAVITATIVE ATTRACTION OF MOON.

2. During Earth's
Rotation. { Two *high* tides on opposite sides.
Two *low* tides on opposite sides.

III. Association.

Compare other cases of Rise of Water. { (a) *Caused by heat. Currents. In seas and oceans.*
 (b) *Caused by rain and snow. In rivers and lakes. (Rise of Nile, Ganges.)*

IV. Formulation.

Full Definition of Tides.

"Tides consist of the alternate rise and fall of the waters of the ocean caused by the difference between the attractive force exerted by the moon on the solid earth and on the water. They occur twice in the course of an interval of twenty-five hours."

V. Application.

1. <i>Effects produced by Tides.</i>	{ (a) Physical. (b) Commercial.	{ i. Wearing of land. ii. Formation of capes and points. (Spurn Head.) i. Landing of steamers. ii. Advantage at mouth of river to a port. iii. Use in construction of piers, etc.
2. <i>Moral Application.</i>	{ "Time and tide wait for no man." "There is a tide in the affairs of men, Which, taken at the flood, leads on to fortune; Omitted, all the voyage of their life Is bound in shallows and in miseries." — <i>Shakespeare.</i>	

PROCEDURE.

I. 1. Introduce lessons by questions as to the simple knowledge the class have of tides. What do we notice about water when tide is in and when out? What do we call rise of water and what the fall? How does it appear to come in? to go out?

2. Where can we see tide come in and go out? Why at mouths of rivers? So it has to do principally with the ocean. When do we see the tide come in generally? (Refer to the sea-side where people wait for the tide, bathing, etc.)

3. How often each day? Is the time regular?

II. 1. Now we shall discover the causes of tide. For a long time before real reason was discovered people noticed all we have noticed; but besides this astronomers remarked that high tide always occurred when the moon was opposite that portion or meridian of earth where the waters rose. This led to the conclusion that the moon must have some influence on the tide. Refer to attraction of moon to earth—this is what keeps it revolving round it; also attraction of earth to moon. Which part of earth will be attracted most? Why? If the part just opposite is ocean, which will have most attraction, water or solid earth? Why? Therefore when both receive it together the increase of attraction of water must be perceptible. Why? If both equally attracted would a rise in water be noticeable? Why not? It was also remarked that the tidal wave travelled from east to west. This showed connection with moon. (Here draw diagram and show tide.)

2. Explain why two high tides, one at opposite sides at *b*, caused by difference in attraction; but this time it is because earth is drawn away from water. Ask why. And make the class explain this—two low tides caused by depression, etc.

III. Now we know why water rises in ocean and makes tide. But are there no other occasions when water rises? What happens at Equator when water is heated? Why is this not like tide? Refer to currents and then to rise in rivers and lakes—floods. Give example of Nile and Ganges, and make the class give reasons for rise in these rivers. Why is it constant, but varying in height? What is the difference between these cases of rise of water and tides?

IV. From this we see it is not sufficient to say that tide

is a rise and fall of water of the ocean. What must we add to the definition? and what is the cause? Why the difference between attraction? When do they occur? Make class give the full definition several times, deducing it by questions. Explain why every twenty-five hours is more correct than every twenty-four hours.

V. All natural phenomena have been meant by God to be of use to man, and we must see now what effects tides have first on the land physically, and then which concerns man even more—commerce.

1. (a) Refer to the wearing of the coastland. Would it be possible if there were no tide? Give example of its action (Goodwin Sands; Holland); meeting of two tides (formation of capes or heads: Flamborough Head and Spurn Head, Dungeness); other effects, too, in ocean (whirlpools, rapid current called race: Race of Alderney—dangerous; refer to loss of *Stella*).

(b) *Commercial*: Ports—landing of ships. Compare Germany, where water in ports is so shallow. Baltic has no tides. Refer to estuary of Thames and Severn; use to ships; wait for tide; saves steam and sail in coming in or going out. At seaside, use to construct under water. Explain how works of a pier are built. Refer to longest pier at Southend. Tide goes out for two miles nearly, so pier is built straight out. Make class repeat effects of tide, and deduce the great value of its being twice a day regularly.

2. Refer to proverb "Time and tide wait for no man". Also get from class, or give Shakespeare's words, "There is a tide in the affairs of men," etc. Show how in commerce it is necessary to take it at the flood and not delay, etc., etc. Apply this to opportunities in life in spiritual order and natural order.

LESSON ON THE PHYSICAL FEATURES OF SCOTLAND.

Class—Age, 12 to 14 years. *Time*—Half an hour. *Illustrations*—Map of Scotland, and sketch map on the blackboard. *Aim*—To exercise the imagination and judgment of the class in picturing physical features and deducing their effects.

MATTER.

I. Preparation.

1. *Position and Shape.* { (a) Northern part of Great Britain, divided by Cheviot Hills.
(b) Shape irregular, deeply indented; width varies from 30 to 150 miles.

II. Presentation.

1. *Relief.* { (a) Covered with mountains in groups and short ranges. Long valleys, generally sloping towards east: hence direction of rivers.
(b) Country divided by two depressions into
(c) Mountainous Regions. { i. Northern Highlands. { North of line from Moray Firth to Loch Lynne.
ii. Central Highlands. { Between Glenmore and Strathmore.
iii. Southern Uplands. { (1) Plateau.
(2) A hilly region.
(3) A hilly region.
2. *Coastline.* { *West*, rocks hard, indented; sea deep.
 East, stretches of cliff, not so high; capes are bold headlands; sand dunes from Kinnaird Head to Moray Firth.
 North, wild cliffs of gneiss, 300 ft. high.

III. Association.

1. Compare relief with England and Ireland.
2. Compare position of mountain ranges and mineral wealth.
3. Compare effect of Atlantic on all three countries.



RELIEF MAP OF SCOTLAND.

IV. Recapitulation.

1. Summary of lesson.
2. Repetition of points of relief of coastline.

V. Application.

- Effect of Physical Features on* {
1. National character (*cf.* Switzerland).
 2. History.
 3. Productions and commerce.

BLACKBOARD SKETCH.*Physical Features of Scotland.**Position and Shape.*

- Relief.* {
1. Northern Highlands.
 2. Central Highlands.
 3. Southern Uplands.

- Coastline.* {
- North.
 - East.
 - West.

- Effects of Physical Features.* {
1. Character.
 2. History.
 3. Prosperity.

PROCEDURE.

I. Question the class on the position of Scotland as regards England and Wales, the boundaries ; notice shape, irregular compared with England and Ireland, yet they are irregular in comparison with other countries. On account of indented coast the width varies from 30 to 150 miles. What would be result of this as regards distance from sea ? Compare England.

II. 1. Relief resembles England in being higher in west than east, but country is generally covered with mountains in groups, short ranges and long valleys, sloping towards east. How will this influence direction of rivers ? Country divided by depressions into :—

i. Northern Highlands, north of line from Moray Firth to Loch Lynne.

ii. Central Highlands, between Glenmore and Strathmore ; and

iii. Southern Uplands, which consist in a plateau, and two successive hilly regions (draw on blackboard if possible).

2. Now we shall look at the coastline. What have we remarked about it already ? and in what way would a mountainous country affect the coastline ? In the *west*, on account of high coast, rocks are hard and sea deep. In the *east*, stretches of cliff, not so high. The capes are bold headlands. Sand dunes from Kinnaird Head to Moray Firth. *North*, wild cliffs of gneiss, 300 feet high. Sea very rough. Refer to Spanish Armada. Ships lost off these coasts in dangerous strait.

III. Compare relief with England and Ireland, situation of mountains, greater height, position of mountains and minerals ; also effect on climate, more rainfall. How does the Atlantic affect England and Ireland ? On coastline or in climate ? But Scotland and Ireland get the full force of its waves, therefore western coasts most indented.

IV. *Recapitulation* : Repetition of points of relief and coastline, *west*, *east* and *north*.

V. Our surroundings affect our lives in character, in our homes, and at school ; so a nation is affected as a whole by the physical features of their native land in three ways.

1. National character, independence ; the natural defences and fortresses have enabled them to resist invasion (*cf.* Switzerland). 2. History ; refer to long resistance, and really never conquered by the sword. 3. Productions and commerce ; question on comparison of products in flat countries and hilly or mountainous ones. How does extent of coastline affect commerce, ports, good harbours ? etc., etc.

Recapitulate points, and ask a few questions.

PHYSICAL GEOGRAPHY LESSON ON THE SCULPTURE OF THE LAND.

Class—Oxford Seniors. *Time*—Three-quarters of an hour. *Aim*—To exercise the understanding of the pupils and lead them to apply their previous knowledge of physiography to explain the present formation of the land.

MATTER.

I. Preparation.

Consider the earth as a Divine masterpiece. *God*—the Divine Sculptor. *Nature*—His Hand.

- | | | |
|--------------------------|---|--|
| <i>Instruments used.</i> | { | <ol style="list-style-type: none"> 1. Original cooling of earth's surface. 2. The atmosphere. 3. Rivers and glaciers. 4. Frost, ice and avalanches. 5. The sea. 6. Upheavals and earthquakes. 7. Volcanoes. |
|--------------------------|---|--|

II. Presentation.

The work of each of the above tools :—

- | | | |
|--------------------------------|---|--|
| 1. <i>Cooling process.</i> | { | <ol style="list-style-type: none"> (a) Subsidence of some parts (oceans), and consequent relief of others (continents) from the strain of contracting. (b) Chief mountain ridges thus formed in direction of axis. (c) No part of present land is part of original solid surface, though possibly on the same sites. Why? |
| 2. <i>Atmosphere.</i> | { | <p>The dissolving or wearing work of gases, vapours, winds, evaporation and condensation, the cause of (c).</p> <ol style="list-style-type: none"> (a) Wearing away mountains. (b) Forming ridges out of tablelands. |
| 3. <i>Rivers and Glaciers.</i> | { | <ol style="list-style-type: none"> (c) Cutting valleys and cañons. (d) Depositing débris partly on plains and chiefly in the sea. In general levelling the high lands to the sea. |

4. *Frost and Ice.* { Filling crevices and joints of rocks, loosening pieces, thus forming avalanches, which wear away cliffs and preserve the sharpness of mountain peaks.

5. *The Sea.* Continually denuding the coastland.

Result of 3, 4 and 5. Laying low of the land and formation of stratified rocks of consolidated debris in the bed of the sea. Only at considerable depths is the earth's surface preserved from decay.

Action of the above counterbalanced by :—

- | | | | | |
|----------------------|---|--|---|---|
| 6. <i>Upheavals.</i> | { | (a) Gentle and uniform. | { | Large tracts of sea-floor raised in its original level condition, seen by the horizontal position of the stratified rocks, <i>e.g.</i> , 1,000 miles of Central and North Russia and China. |
| | | (b) Disturbed and sudden. | | By volcanic action; when the stratified rocks present a crumbled appearance as if tilted up; the oldest rock highest. Age of mountains can be told by the number of upheavals apparent. |
| | | (c) Volcanoes form mountain peaks with lava. | | |

III. Association.

Comparisons and examples throughout.

For 1. Compare cooling of roast apple.

For 2. The work done by a cyclone on land or by a strong wind dashing sea on land.

For 3. Glaciers of the Alps. Deltas of Mississippi and Nile. Cañons of Colorado.

For 4. Landslips after severe frosts. Peaks of the Alps called "Needles".

For 5. West coast of England and Scotland indented and rugged.

For 6. (a) North of Russia and Siberia.

(b) Andes and Rockies, Alps, etc.

(c) Teneriffe, Vesuvius (Herculaneum and Pompeii).

IV. Recapitulation.

Question on the agents at work and the work done by each.

V. Application.

Moral lesson, some such as the following :—

1. The slowness and continuity of God's work.
2. All things work together towards His end.

PROCEDURE.

Introduce lesson by comparing the formation of the land to the work of a sculptor. Briefly draw from class the points of resemblance. By referring to the earth as a planet and comparing with Jupiter, elicit what was its original condition. Let us now consider the influences at work upon it which have in course of ages reduced it to its present condition. What took place gradually in the gaseous globe? Ask what effect this cooling process had on the globe when it solidified. Refer to the familiar example of a roast apple cooling, to elicit the subsidence of some parts and relief of others; deduce from this the cause of unevenness of earth's surface, and how oceans and continents were formed. From map of world show that the greatest mountain ranges are from north to south owing to the great lateral pressure caused by the subsidence of land forming the oceans. Show diagram of section of a mountain range with evidences of successive upheavals, and let class deduce from this that possibly the position of them has remained the same through all these ages. From the well-known destructive work of rain, rivers, etc., draw from pupils that though the *sites* may

be the same the actual substance must have been worn away many times and built up again. This leads us to consider the chief instruments Nature uses to wear away the land. Let class name some, *e.g.*, 2, 3, 4, 5. For examples of 2, refer to the destructive power of winds, *e.g.*, cyclones in tropics; also air loosening the rocks by expansion in their crevices. Then go on to the results of evaporation and condensation, and elicit the work of rivers and glaciers. Give examples of glaciers grinding down valleys and carrying débris to the sea. What rivers do to the land below snow-line glaciers do above it. From example of deltas of Nile, Ganges and Mississippi, draw from class the work of rivers; describe the cañons of Colorado.

Compare the action of rain in the gutter to show how rivers cut up plains and tablelands, even when composed of hard rock. Next, pass to the action of frost, and elicit landslips and avalanches. Ask how these are caused. Lastly ask how the sea helps in the work of degradation of the land, and elicit instances of its work, *e.g.*, Zuyder Zee, "The Needles," west coast of British Isles, etc. Collect together the work of (1) The atmosphere; (2) rivers and glaciers; (3) frost; (4) the sea; and ask class what is common to it all, and what must be the eventual result if there were not some counter-action.

Show illustrations of 6 (a) and (b). Question as to their manner of formation, and deduce the two kinds of upheavals. What facts can be deduced from the structure of our coal-fields? Point out that these stratified rocks were formed in the ocean beds which must have risen gradually—judging by the horizontal position of the layers—the newest on top. Contrast illustrations of sudden upheavals as to position of oldest rock. Finally refer to volcanoes and earthquakes, and how they influence the earth's crust, even in the ocean beds.

Conclude lesson by a short summary, dividing the instruments of Nature into two classes: those which level, and those which raise the land's surface, and recapitulate.

Give some examples of how the change of temperature

is instrumental in sculpturing the land. Trace the work of rain falling on a tableland. How does it resemble the action of snow above snow-line? What reason is there for supposing the principal mountain ranges of the continents to be on the *sites* of the original contractions of the earth's crust?

THE CAPE TO CAIRO RAILWAY.

(The subject-matter will need bringing up to date.)

Class—Average age, 16 years. *Time*—Forty minutes. *Aim*—To interest the class in the progress of modern times and especially in the scheme of Mr. Cecil Rhodes.

MATTER.

I. Preparation.

- | | | |
|---------------------------------------|---|--|
| 1. <i>What led to its Conception.</i> | { | (a) The telegraph the pioneer. Mr. Rhodes.
(b) 1,800 miles to Umtali.
(c) "White man's wire that talks."
(d) One-tenth of funds found by Rhodes.
(e) To be completed in five years, probably 1904, and reduce 5s. to 3s. 6d. |
|---------------------------------------|---|--|

II. Presentation.

- | | | |
|------------------------|------|---|
| 1. <i>The Idea.</i> | { | (a) To connect British territory in North and South Africa.
(b) Outcome of telegraph.
(c) Attraction of name Cape to Cairo. |
| 2. <i>Route.</i> | { | (a) First in direction north to south on globe.
(b) Egypt, Soudan, German East Africa, Rhodesia and Cape Colony. |
| 3. <i>Three Parts.</i> | | |
| (a) <i>Completed.</i> | i. { | Cairo to Berber and Atbara. { Kitchener and late Egyptian War. Cf. Gordon. Atbara Bridge, 37 days' order from America. Want of water. |

Idea of natives: "Spirit" hard worked.



- (a) *Completed.* ii. $\left\{ \begin{array}{l} \text{Vryburg in} \\ \text{Bechuanaland} \\ \text{to Buluwayo} \\ \text{in Rhodesia.} \end{array} \right\}$ Mr. Rhodes's own expenses, few difficulties to engineers.

Idea of natives in south: Engine full of oxen.

- (b) *Building.* $\left\{ \begin{array}{l} \text{i. Buluwayo to Salisbury and Zambezi.} \\ \text{ii. Berber to Khartoum. Difficulties of} \\ \text{clearing; level; fording of rivers.} \\ \text{Valley of Zambezi, etc., in i. and ii.} \end{array} \right.$
- (c) *Proposed.* $\left\{ \begin{array}{l} \text{German East Africa, British East Africa,} \\ \text{Abyssinia, Rhodesia and Lake} \\ \text{Tanganyika.} \end{array} \right.$

III. Association.

1. Compare with Canadian Pacific of 1885 as to engineering and uses.

2. With Siberian line; so useful to England; brings Australia nearer.

3. Cape to Cairo, not much saving to time or traffic.

IV. Recapitulation.

Recapitulate chief points by questions and write them on blackboard, and allow pupils to copy the scheme as foundation for an essay.

V. Application.

1. Great undertakings generally due to energy of one or two, who never reap the good result of their efforts. Cf. various inventions, the pioneers of Australia and Africa, etc.

2. Class to reproduce account in their own words in the form of an essay.

PROCEDURE.

I. Introduce lesson by asking class what is the meaning of the saying, "The world is shrinking". What inventions in the past century have caused it to appear to become smaller? Then lead on to the telegraph and the railway systems of the world—how the telegraph is generally a pioneer of the railway, and relate how the idea of Cape to

Cairo was the work of Mr. Rhodes. Relate circumstances connected with points in preparation, and give the class the latest result reached by the telegraph, and how much more still to be completed, etc., etc.

II. Origin of idea not very useful to commerce. Why are North and South Africa connected in the British mind? But are they connected as to commerce, trade, interest? Why not? Notice direction of railway. Compare with other great systems; this is the first in a north and south direction. Use map of Africa and draw from class the countries to be traversed by the railway. Are they all British territory? Which are, and which are not? Will the whole route be an easy matter then? Why not?

(Trace on blackboard with coloured chalk a sketch of route, dividing it into three parts: completed, building, and proposed.) Question as to parts completed; when finished.

How the war in the north *led* to completion as far as Berber. Relate energy of Kitchener and the famous American bridge. What does this augur as to British trade? Would Gordon's destiny have been averted if a railway had existed? Why? Explain difficulties in construction. Would the Nile be a help or hindrance? Show how the idea of natives at first sight of train was the outcome of their general characteristics. Contrast with south. Who was the leader here (show photo). How had the late war affected the railway? Different result to North Africa. Why would engineering be easier here? What great river will have to be crossed? Relate estimation of engineers as to the bridge across the Zambezi, and show picture of Victoria Falls. What is usual mode of conveyance in south—the chief beast of burden? Hence idea of natives that the engine was full of oxen.

(Trace places on blackboard, sketch as lesson proceeds, and show pictures, etc., where possible.) Treat in a similar manner the *part building*. Refer to difficulties, and draw these from class by questions on the physical features of the country; also *part proposed*. What new difficulty will arise? What nations will have to be consulted? Why? etc.

III. Compare with Canadian Pacific, which began as a political necessity and became a commercial enterprise. The marvels of engineering in the construction, etc., also with "Russia's iron grip on China," which will not cost England anything, but be of more service to the British than to any other nation. Why? What countries will it bring nearer? The Cape to Cairo not much saving of time, journey of eleven days estimated from Cape to Cairo; while England to Cairo is five, thus sixteen in all; and now England to Cape by sea is seventeen.

Probably in the unknown future the railway will prove to be of great use when its originators are beyond the reach of praise.

IV. Recapitulate points by questions, and give short notes for essay.

V. Draw lesson of life that few reap here below the reward of their inventions, labours and enterprises. Draw from class examples of this in history, great sailors and soldiers, artists, statesmen, inventors, etc.

LESSON ON NATURE OF HEAT AND ITS EFFECTS.

Class—Oxford Junior and Senior. *Time*—Three-quarters of an hour. *Previous Knowledge*—Some of the common effects of heat. *Aim*—To exercise reason in discovering cause and effect, and deducing principles from examples.

MATTER.

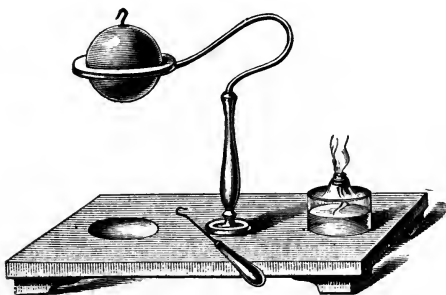
I. Preparation.

- | | | |
|--|---|---|
| <i>Experiment</i> with
basins of hot,
cold and tepid
water. | { | 1. Relative sensation of heat.
2. Heat absent = cold.
3. Heat is the agency which produces
a difference of physical condition in
bodies.
4. The different condition produced, as
long as no change of state occurs,
is called <i>temperature</i> . |
|--|---|---|

II. Presentation.

1. *Nature of Heat.*
- (a) Formerly thought to be fluid.
 - (b) Now a vibratory movement among the particles of matter.
 - (c) Heat in combustion. { Chemical change due to interaction of molecules.
 - (d) Heat as form of energy. { Does work. Bullet and target.

2. *Effects of Heat.*
- (a) Change of temperature. { *Example* : Sun and fire effect this.
 - (b) Expansion. {
 - i. Solids. { *Example* : Bar of metal.
 - { *Exceptions* : India-rubber.
 - ii. Liquids. { Boiling and rising of water.
 - iii. Gases. { *Cf.* cause of wind.
 - (c) Change of state of aggregation.
 - (d) Chemical action.



GRAVESAND RING.

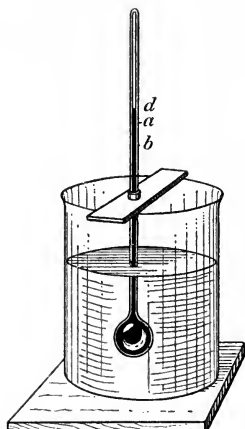


DIAGRAM TO ILLUSTRATE
EXPANSION OF LIQUIDS.

Experiments.

1. *Gravesand Ring.*
(Expansion of solids.)
2. *Expansion of Liquids.*
 - (a) *Bulb* expands and liquid sinks to *b*.
 - (b) *Liquid* expands and rises to *d*.
 - (c) If cooled liquid returns to *a*.

III. Association.

All familiar examples given during the course of the lesson.

IV. Recapitulation.

1. Definition of heat.
2. Its nature and effects.
3. Experiments as proof.

V. Application.

Allowances made for effects of Heat.

1. Railways. Bridges.
2. Metal pipes. Wheels.
3. Effects felt in summer.
4. Safety valves.

BLACKBOARD AT END OF LESSON.

Nature and effects of heat.

1. *Nature.*

2. *Effects.*

- (a) Temperature.
- (b) Expansion.
- (c) Change of state.
- (d) Chemical change.

Solid, liquid, gas.

Illustrations: Three basins of water. Candle, bell, gas. Gravesand ring and expansion of liquid in tube.

PROCEDURE.

I. Question the class as to ordinary meaning of hot, warm, as applied to things we feel and touch (perform experiment with basins of water and deduce that the sensation is *relative*). Explain relative by reference to relative move-

ment, relative weight. Question so as to deduce that cold is the absence of heat. What is it then that produces this physical difference in bodies? What name do we give to the doer of any act? Then we say heat is the agency which produces a difference of physical condition. Is there any other way of expressing the fact that one body is hotter than another? Instead of saying it has greater heat we say what? Therefore the condition produced by heat so long as no change of state occurs is called *temperature*.

Now we shall consider what this heat is. Formerly it was thought to be a fluid. What is a fluid? What two states of matter come under the name of fluid? But now heat is discovered to be a vibratory movement among the particles of matter. (Exemplify this in boiling water, then in combustion, which is an interaction of molecules producing a chemical change.) Heat as a form of energy.

II. Question class as to effect produced by sun, the great centre of heat, and by fire. What is this physical condition called? It is only so called when no change of state occurs in the body effected by heat. The first effect of heat then is change of temperature. (Here show experiment of Gravesand ring on blackboard if apparatus not available, and deduce the result that heat causes expansion.) Is there anything else besides solid matter that will expand with heat? What causes the kettle lid to move? the water to boil? (Refer here to separation of molecules, and hence resistance of pressure.) (Show experiment 2.) Now in physical geography is there any example of another state of matter being affected by heat and expanded? Hence cause of winds. Use of a fire in room causing a draught, etc. Now we have seen that in the second effect of heat how many things may be made to expand. (One exception to this, india-rubber.) Now what did we say occurred when water boils? But does not the heat change the water? Into what? Steam. Can this be said to rise in temperature? Why not? What is temperature? Apply heat to ice, what change shall we have? Now we see that heat can change state in how many ways? Liquid to gas, and solid to liquid. What happens to wax

under heat? Therefore what is the third change effected by heat? This is called state of aggregation.

III. There is one more effect produced by heat, and this has to do with combustion. Now, when for instance a candle burns, what effect has the heat upon wax? Under which effect may we class this? Do experiment of water and soot formed from candle, and deduce that new substances have been formed from heat applied to candle-wick, and these are formed by combination of different materials in wax, etc. This is called a chemical change because new substances are found by combination.

IV. (Recapitulate effects of heat and examples of each.) Now all these effects of heat cannot be overlooked in working materials which are so affected. In the summer-time, when temperature is so high, what will happen to metal bridges, pipes, etc.? To counteract this allowance has always to be made for expansion. Why? In railway lines, bridges, pipes, etc.? To come to familiar examples, gloves in summer, loosening glass stopper. In engine's safety valve. Why?

V. Recapitulate nature of heat and its effects. Proofs of each.

LESSON ON THE PROPAGATION OF HEAT.

Class—Oxford Junior and Senior Divisions. *Time*—Three-quarters of an hour. *Previous Knowledge*—Nature of heat. *Aim*—To exercise reason and judgment of class in discovering cause and effect.

MATTER.

I. Preparation.

Familiar Examples to prove that Heat is transferable. {

1. The heating of a kettle of cold water.
2. Use of fires and stoves.
3. Mixing of water at different temperatures.
4. Things dried in sun.

II. Presentation.

Heat transmitted in three ways.

1. By Conduction. { (a) Transfer from particle to particle through mass of substance in direction of decrease of temperature.
(b) In solids.

Example : Poker in the fire.

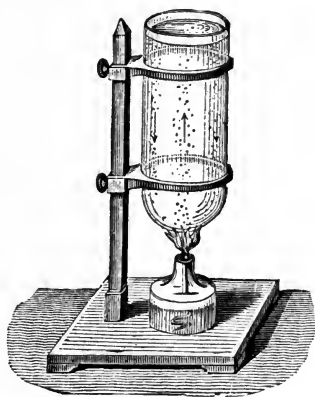
Good Conductors.—Metals ; less good—marble, slate, glass.

Bad Conductors.—Organic substances, brick.

- Proofs*. { 1. How objects feel to the touch.
2. Woollen material to keep in heat.
3. Copper ball wrapped in handkerchief and held over burner.
4. Differences proved by bars of different metals in fire.

2. By Convection. { (a) Transmitted by motion of heated particles from one point of body to another.
(b) In fluids.

- Examples*. { i. Boiling water and winds.
ii. Draughts, ventilation.
iii. Trade winds, land and sea breezes.
iv. System of heating by hot-water pipes.



CONVECTION CURRENTS USED DURING THE HEATING OF WATER.

3. By Radiation. { (a) Transmitted from one body to another through an intervening medium, without affecting the temperature of medium.
(b) Fire and sun give heat in this way.

- Examples.* {
- i. Thermometer in vessel exhausted of air, affects sides.
 - ii. Something held in front of fire.
 - iii. Stoves ; hot-water pipes.

III. Application.

- Example of Working of Hot-water Pipes.* {
- 1. Heat passes from furnace to water through boiler by *conduction*.
 - 2. Passes through water by *convection*.
 - 3. From water through pipes to air by *conduction*.
 - 4. Air to person, *convection*.
 - 5. Pipes also *radiate* heat.

PROCEDURE.

I. Question class on familiar examples, as heating water in a kettle, a room by a fire, and mixing water at different temperatures, and make them deduce that heat is transferable. What happens when a hot body is put in contact with a cold one? Refer to what we do to get warm, therefore heat is transferable.

II. Heat is not always transmitted in the same way. (Examples of poker in fire and bar of metal.) Which part will be last to feel hot? Deduce heat travels in solid in direction of decrease of temperature. On blackboard show how particle transfers to particle. This is called conduction, and is the method of transmission in solids. (Here do experiment of silver and wooden spoon in hot water, also copper wire over gas.) Deduce that conduction is not same in all materials. Give examples of good and bad conductors. How discovered by sense of touch, and reasons. Familiar examples, blankets, light woollen materials, spoon in tea and hot water, etc.

We have seen how heat is transmitted in solids. What is the other state of matter affected by heat? Draw experiment on blackboard and deduce the difference between it and conduction. Particles move from one point of body

to another. Examples given and elicited from the class. Boiling water, winds, draughts, ventilation. Land and sea breezes. Hot-water pipes.

Deduce third method by example of rays of sun. Do not reach us by convection. Why by conduction? Refer to fact that air nearer sun and yet not warmer than earth. Therefore heat must pass through without affecting it. This method of transmission called radiation. Refer to term and word *ray*. Fire also gives heat this way. Use of fire-screen. (Refer to dark rays and light rays, and show that in radiated white heat we really speak of light.) (Draw experiment.) Familiar examples, stoves and hot-water pipes, etc. Warming of atmosphere.

III. Explain working of hot-water pipes. How heat passes by conduction, convection and radiation, questioning class as to method of transmission in each case.

<p>Summary: Heat is transferable and transmitted in three ways.</p>	<p>{ <i>Conduction</i>: passage from particle to particle—<i>solids</i>. <i>Convection</i>: passage of one particle to another place in body—<i>liquid</i> and <i>gas</i>. <i>Radiation</i>: passage from one body to another without affecting medium.</p>
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Recapitulation: How can we prove that heat is transferable? In how many ways can heat be transferred? What is conduction? What are good conductors? Name some bad conductors. What is convection? In what bodies is heat transmitted by convection? What is radiation? How is heat transferred in this way? Give some examples. Give one example which will include all three.

LESSON ON THE CONDUCTION OF HEAT.

Class—Average age, 16. *Time*—Forty minutes. *Previous Lessons*—
1. Nature of heat, its effects; 2. Transmission of heat; 3. Thermometer;
4. Expansion of solids. *Aim*—To lead the class to deduce the difference
of conduction in different materials, and apply this fact to familiar
examples.

MATTER.

I. Preparation.

- | | | |
|-------------------------------|---|---|
| 1. <i>Familiar Examples.</i> | { | (a) Heating of kettle of cold water.
(b) Use of fire, stoves, etc.
(c) Mixing of water of different temperatures.
(d) Contact of hot and cold brick. |
| 2. <i>Principles Deduced.</i> | { | (a) Heat is transferable.
(b) Transmission continues till both bodies are of the same temperature. |

II. Presentation.

- | | | |
|-----------------------|---|---|
| 1. <i>Conduction.</i> | { | Transfer from particle to particle through mass of substance in direction of decrease of temperature. |
|-----------------------|---|---|

Illustrated by simple examples of transmission of motion. Heat is a vibratory motion, hence transmitted by contact of particle and particle.

- | | | |
|---------------------------------|---|--|
| <i>Examples to be Analysed.</i> | { | (a) Bar of metal.
(b) Spoons in hot liquid.
(c) Poker; hot water in jug. |
|---------------------------------|---|--|



DIAGRAM TO ILLUSTRATE DIFFERENCE OF CONDUCTIVITY IN SILVER AND BRASS.

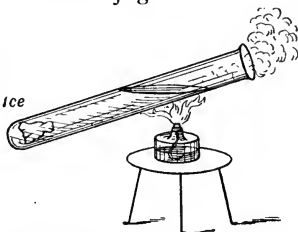


DIAGRAM TO ILLUSTRATE LOW CONDUCTIVITY OF WATER.

- | | | |
|------------------------------|---|---|
| 2. <i>Familiar Examples.</i> | { | (a) Wooden and silver spoon in hot water (have apparatus for experiment in class-room). |
|------------------------------|---|---|

2. *Familiar Examples.* {
- (b) Copper wire and paper.
 - (c) Bars of metal with balls attached with wax.
 - (d) Spoon in hot tea.
 - (e) Spoon in glass to prevent hot water breaking it.
 - (f) Clouds, snow, ice in test-tube.

- Facts Deduced.* {
- (a) *Good Conductors.* { Metals, marble, stone ;
and, less good,
glass, etc.
 - (b) *Bad Conductors.* { Organic substances,
liquids, gases.

III. Assimilation.

- Application of Good and Bad Conductors.* {
- 1. How things feel to the touch, and why.
 - 2. Reference to clothing, etc.
 - 3. Glass pavement ; double windows in cold countries.
 - 4. Davy lamp.
 - 5. Norwegian cooking { Sketch on black-board, or show picture of.

IV. Recapitulation.

As in procedure.

PROCEDURE.

I. Question the class briefly on previous knowledge concerning heat, its nature, etc. We shall confine ourselves to *one* mode of transmission, namely, conduction.

Mention familiar examples as in matter, and question on each so as to deduce the fact that heat is transferable ; also that transmission continues until both bodies are of the same temperature.

What do we do when we wish to heat water ? Why do we go to some source of heat ? When we mix hot and cold water why is the mixture tepid ? In this case does the hot water pass on all its heat ? When does the transmission cease ? (Deduce principles (a) and (b) and let class formulate them.)

II. 1. Refer to simple examples of transmission of motion as in railway carriages and shunting engine, croquet

balls, persons alighting from a train, etc. What have we found heat to be? This motion may also be passed on from particle to particle. Here analyse examples of transmission (a), (b) and (c).

2. Place a silver spoon, a wooden spoon and a glass tube in a jug of hot water, and draw from class, by allowing them to touch ends of each after a few minutes, that (1) conduction is different, (2) silver has highest conductivity of the three. In a similar way go through examples (b), (c), questioning so as to deduce the different degree of conductivity. (Experiment (c) to be sketched on blackboard.) In example (d) bring out the point of the air being a bad conductor, and refer to difficulty of experimenting on gases, and why. In (e) point out comparison of silver and glass. In (f) the proof of low conductivity of liquid, except mercury. Deduce this by reference to lesson on thermometer. Make class classify substances mentioned into good or bad conductors.

III. If I touch the carpet, the wall, or a piece of marble, what shall I notice about the sensation produced by each? Does this prove they are at different temperatures? Why not? (Deduce in this way that good conductors feel cold because they absorb heat so quickly from the hand that they give it a sensation of cold.) In a similar way refer to use of loose clothing. Mention glass pavement proposed in Lyons, and elicit use as a bad conductor, also double windows. Explain by sketch the effect of wire gauze and flame in reference to Davy lamp. Explain Norwegian cooking-box and sketch it.

IV. *Recapitulation* of points of presentation. How can you prove that heat is transferable? What do you mean by conduction? Explain some experiment to prove difference of conductivity in metals. Name some good conductors and bad conductors. Give some application of these. Why would glass pavement prevent water freezing on it quickly? Why is it warmer to wear two thin woollen garments than *one* of double thickness? etc., etc.

LESSON ON A MERCURIAL THERMOMETER.

Class—Oxford Senior and Junior. *Time*—Three-quarters of an hour.

Aim—To teach construction and use of the mercurial thermometer.

MATTER.

I. Preparation.

1. Meaning of terms. $\left\{ \begin{array}{l} \textit{Thermos} = \text{hot.} \\ \textit{Metron} = \text{measure.} \end{array} \right\}$ Greek.
2. Why measurement is necessary. $\left\{ \begin{array}{l} \text{Because heat is a relative sensation.} \end{array} \right.$

II. Presentation.

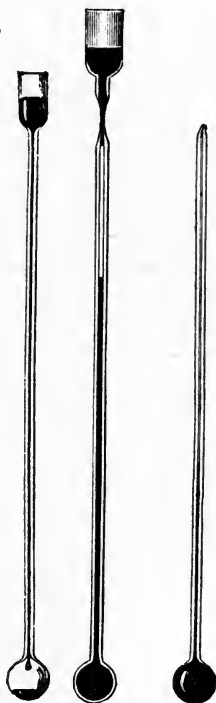
1. Description. $\left\{ \begin{array}{l} (a) \text{ Glass tube with bulb.} \\ (b) \text{ Mercury. } \left\{ \begin{array}{l} \text{Because expands} \\ \text{easily and uniformly,} \\ \text{and has a high} \\ \text{boiling-point.} \end{array} \right. \\ (c) \text{ Scale of degrees. } \left\{ \begin{array}{l} \text{i. Fahrenheit.} \\ \text{ii. Centigrade.} \end{array} \right. \end{array} \right.$

2. Construction. $\left\{ \begin{array}{l} (a) \text{ Glass-blown.} \\ (b) \text{ Filling by pressure.} \\ (c) \text{ Boiling to exclude air.} \\ (d) \text{ Sealing.} \\ (e) \text{ Graduating.} \end{array} \right.$

3. How the Thermometer acts. $\left\{ \begin{array}{l} (a) \text{ Effect of heat on liquids and solids.} \\ (b) \text{ Apply to thermometer.} \\ (c) \text{ Mercury expands most, hence rises with heat and falls with cold.} \end{array} \right.$

III. Association.

1. Compare $\left\{ \begin{array}{l} \text{Barometer.} \\ \text{Hygrometer.} \end{array} \right.$



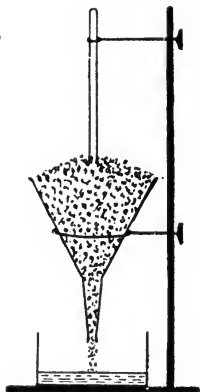
THERMOMETERS.

IV. Application.

*Uses of Thermo-
meter.*

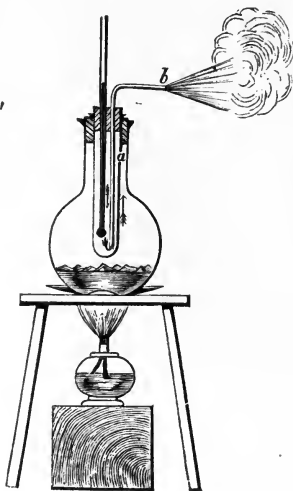
1. To measure temperature of air.
2. To measure temperature of water.
3. Used in sick-room (clinical thermometer).
4. Used by gardeners.

A'



TO OBTAIN OR TEST THE
FREEZING - POINT OF A
THERMOMETER.

B'



TO OBTAIN OR TEST THE BOILING-
POINT OF A THERMOMETER.

V. Recapitulation.

1. Description of instrument.
2. Construction.
3. Action and uses.

PROCEDURE.

I. Introduce lesson by questions on derivation of name "thermometer". Why is it necessary to measure heat? Has this measurement become useful in the case of health? How? Do you know of any other instrument for measuring in which mercury is used?

II. Show a thermometer (mercurial) and deduce the description of what is necessary to make up the complete instrument.

2. *Construction*.—(a) Glass-blown. (b) Tell the fact that tube is heated. What will happen to the air in this state plunged into mercury? What will happen to the mercury? Why will it rise? Why not so much as in a barometer? What is there to prevent it here which is not in the barometer? (Repeated two or three times.) (c) Then mercury heated and boiled to exclude air, and, when quite reached the top, (d) sealing, etc. What will happen when sealing is over and mercury cool again? What will be formed at top of tube? Would the instrument be of use for *measurement* as it is? Why not? The next step is called *graduation*, and consists in marking the boiling-point and freezing-point. Draw figures *A'* and *B'*, and deduce why one in ice and one in steam. Space between is divided into 180° F. and 100° C. (Refer to a slight correction being necessary on account of glass expansion, but so small as need not take into account here.)

Now we have our instrument, how does it act? What affects the mercury, and why? How does mercury behave? Why is it able to rise? Why is water not better for use? (Show alcohol thermometer, and say why used in garden thermometer.)

III. Associate with barometer, and find out chief differences in construction, use, etc., etc.

IV. Question as to uses of thermometer. What necessity is there for measuring temperature of air, of water? Use in sick-room? Why an accurate test? Name given to special kind. In outdoor use how does its utility appear in gardens, greenhouses, etc.?

Recapitulation: Describe the instrument. How is the mercury put into the tube? Why is boiling necessary? When is the tube sealed? How is the point of freezing determined? The boiling-point? Why is mercury the best liquid to use? Give some occasions when thermometers are very useful.

NOTES OF A FIRST LESSON ON SOUND.

Class—Average age, 11 years. *Time*—Half an hour. *Aim*—To lead the class to take an interest in natural phenomena.

MATTER.

I. Preparation.

Question class as to how we become aware of what goes on around us. What does our *ear* convey to us? Sound.

II. Presentation.

Strike lightly desk, the bell, a glass, etc. Class to deduce cause, *viz.*, contact of two bodies.

Some bodies give a prolonged sound if struck only lightly, *i.e.*, sonorous bodies.

(a) *Experiments to be performed.* { Strike wineglass with pencil, pupil to put finger on the edge.
Strike tuning-fork, child to take hold of it to check vibrations.

Facts to be stated by class. { When glass is struck gives out a clear sound and trembles. When trembling ceases, sound ceases; same with tuning-fork.

Deduction to be made: That the trembling of the body produces the sound.

(b) *Experiment to be done or described.* { Bell rung in a vessel exhausted of air gives no sound. Slight noise made outside a closed window not heard in room.

Deduction to be made: Air transmits vibrations to the ear.

(c) *Facts to be stated by teacher.* { People apply ear to ground to catch distant sound of carriage wheels, etc. People fishing must be very quiet if they wish to catch any fish.

Deduction to be made: Solids and liquids transmit sound better than air.

(d) *Facts to be stated.* { In a thunderstorm we see lightning before we hear thunder. When a gun is fired we see the flash before we hear the report.

Deduction to be made: Sound does not travel as quickly as light.

III. Association.

Refer to echoes and their cause.

An echo is the repetition of a sound once or several times. Generally heard in front of a rock or high wall.

Sound goes forward and strikes the obstacle and is reflected back again.

IV. Application.

Uses made of the principles of sound:—

1. In the telephone.
2. Buildings, *e.g.*, churches and lecture halls, etc.

V. Recapitulation.

Question on the above matter as in procedure, or similarly.

PROCEDURE.

I. Introduce lesson by questioning class as to how we become aware of what passes around us. By which of our senses do we perceive light? What does our ear convey to us?

II. Strike several objects, and let class say what is produced in each case. Ask class what has been done to make the sound. Then let some one state the cause, *i.e.*, contact of two bodies.

Strike the bell and the desk and let class say what difference there is in the sound. Let them point out that some bodies give a more prolonged sound than others. Then give the term *sonorous*, and write it on board. Connect it with the French word, *sonner*, to ring.

Let pupil strike gong, wineglass, tuning-fork, then touch them and tell class what he notices. Let class point out what happens as soon as the body is touched. Sound

ceases. What two things cease together? The sound and the trembling. What then is it which produces the sound? The trembling. Ask if any one knows the proper term for this trembling. If they do not know, tell them, and write word *vibration* on board.

Recapitulate here.

Tell class the experiment of bell swinging in a bell jar exhausted of air. Tongue of bell seen to swing violently. Let class say what we should expect to hear. Tell them that we hear nothing. When air is introduced into the jar we hear a sound. Draw from class that the air transmits the sound.

If two bodies are struck lightly outside a closed window is the sound heard in the room? If a loud noise is made is it heard? Tell how sound strikes against the pane of glass which vibrates and communicates it to the air by means of which it reaches our ear.

Refer to the Indians who are accustomed to apply their ear to the ground to catch sound of approaching steps, or put their heads under water to hear if enemy's boats are approaching. Ask class if any of them have ever been with persons fishing, and what they had to be careful about. If they do not know tell them that people who want to catch any fish have to be very quiet because the fish hear the least sound. Draw from class that solids and liquids transmit sound better than *air*.

Now let us see how sound travels. Ask class which they perceive first during a thunderstorm, the thunder or the lightning. Tell them that both are produced at once. Then how is it we see the flash before we hear the sound? Refer likewise to firing of a gun and other examples to illustrate this, and let class point out that sound does not travel as quickly as light.

III. What do we hear when we speak in a large, empty room? Let class say what an echo is, and draw from them its cause, *i.e.*, the reflection of the sound from the object struck. Tell class about the echo in Milan which repeats thirty-two times, and the whispering gallery in St. Paul's,

IV. Point out uses of the knowledge of principles of sound in buildings: churches built in such a way as to convey sound well. Ask class if they have ever noticed a board placed over the pulpit in churches. Tell them it is called a "sounding" board, and point out what is its purpose.

Summary: Sound is produced by the contact of two bodies. Some bodies produce a prolonged sound if struck only lightly; these are called sonorous bodies. When the body is struck the particles tremble; this is called vibration. In order that vibrations may produce sound, something is necessary to convey them. Air is a means, and solids and liquids still better ones. Sound travels less rapidly than light. An echo is the repetition of a sound, and is generally heard in front of a high rock or wall. Sound goes forward and strikes against obstacle, from which it is reflected back.

V. *Recapitulation*: How is sound produced? What are sonorous bodies? How is it that we hear the vibrations of a body? Which are the best means for transmitting sound? Why do we see the flash of a gun before we hear the noise?

NOTES OF A LESSON ON THE PRESSURE OF FLUIDS (IN A CLOSED VESSEL).

Class—Oxford Senior; age, 15 to 17. *Time*—Three-quarters of an hour. *Aim*—To prepare pupils for lessons on barometer and kindred subjects.

MATTER.

I. Preparation.

Reference to definitions of	{	Fluid
		and
		Pressure.

II. Presentation.

1. At any given point the pressure of a fluid in an enclosed vessel is in all directions equal.

(a) *In all directions*.—Experiments to prove.

i. Place vessel on balance empty, fill with gas or water; note increased weight of *downward pressure*.

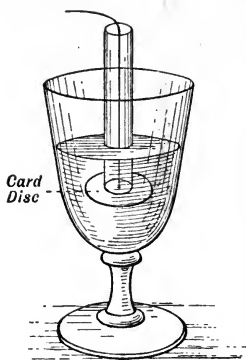


FIG. 1.

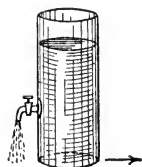


FIG. 2.

ii. Take a tube open at both ends as in Fig. 1, and close one by a card disc, then plunge it beneath the water. The string to which it is attached must be held till a sufficient depth is reached, when it will *not fall off*, but is kept in place by the upward pressure of the water. Pour in water and the disc will keep its place till the level outside and in are equal, *i.e.*, till downward inside + card weight = upward outside.

iii. Movement backward of a discharging vessel, also the fact that it will discharge at the side as in Fig. 2.

(b) *Equally*.—This is proved by immersing a ball in fluid and observing that after a certain time it obtains equilibrium, or what is the same a triangular prism whose sides are of vertical section. Proved indirectly by 2.

2. Fluids transmit any pressure perfectly, *i.e.*, without loss or waste through their *whole* substance.

(a) Pressure given in one direction is transmitted in all on account of 1 (a).

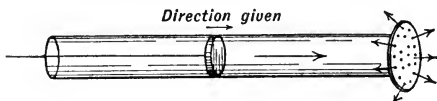


FIG. 3.

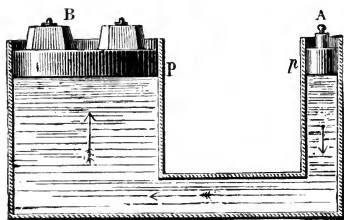


FIG. 4.

- Experiments. {
- i. Piston with rose at end, filled with water then discharged as in Fig. 3.
 - ii. Discharge of wine from barrel, etc.

III. Association.

Experiments performed.

IV. Application.

1. *Principle of Hydraulic Press.* (Pascal's plan.) Fig. 4.
Amount proportional to the *areas*.

If tube A be to tube B as 1 is to 16, pressure of 1 lb. at A = 16 lb. at B.

Pressure of 1 kilogramme at A = 16 kilogrammes at B.

V. Recapitulation.

Question on points given and on experiments performed.

PROCEDURE.

I. 1. Open lesson by questioning class as to the definition of a *fluid*, and show that for convenience' sake only the experiments will be formed in a liquid (water). Ask what is generally understood by pressure. Draw from pupils that solids resist disintegration, therefore that the particles press towards each other; that the only other force exerted is weight—result of gravitation. If possible, have a balance and weigh first an empty, then a full vessel, and show from the difference that the particles of the liquid are *acted on by gravitation*. Kind of pressure. Point out that when we say one pint of water presses down so many ounces, we mean the combined weight of all particles.

II. Perform the experiment, and by questioning draw from the class that:—

When disc keeps its place it is acted on by three

$$\text{pressures} \left\{ \begin{array}{l} \text{air above} \\ \text{own weight} \\ \text{water, air} \\ \text{in water} \end{array} \right\} \begin{array}{l} \text{downward.} \\ \text{upward.} \end{array}$$

Pouring in water, show we may leave out air. Why? Stop when space between disc and water-level unequal. Question why card does not fall off. When will the same amount of water press? When same level inside and out?

Therefore card falls. Why? Question as to direction of pressure.

Refer to tapping a wine cask. Show a sketch on black-board of a vessel with lateral discharge. Draw from class that:—

It would not discharge if there were no lateral pressure.

Removal on one side (by tap) and no removal on the other destroys equilibrium. Question as to result. Give other examples.

Recapitulate and question as to direction of pressure discovered, then refer to liquid in a hollow sphere. Must press; how?

Equally: We have shown that in a liquid there is pressure in every direction, we have now to consider any liquid *at rest*, and discuss the amount in each direction. Let us consider the formation of a soap bubble, the fluid inside it, and once formed, the shape of bubble, but if more pressure against one side, what does this teach us? Again, what does our second experiment teach us about the up and down pressure at the level of the disc when inside and outside levels are alike? A soft, inflated ball keeps its shape for the same reason. Ask for other examples. Sum up and write first point on blackboard, making class read it.

Show or draw a piston as in 1.

Elicit from class by questions that *one* direction is given to water; it is transmitted equally in all directions. Refer to raising of water from reservoir through pipes.

Ask for familiar examples, *e.g.*, hole in top of teapot. Why? To admit air; use, downward pressure transmitted sends tea through spout from body. Other examples are seen in eddying circles round a stone dropped in water. Tidal disturbances in remote channels, *i.e.*, remote from great disturbances, *e.g.*, English Channel disturbed from Atlantic Ocean.

All buoyancy of fluids due to this combined with upward pressure.

III. *Association*. Experiments performed.

IV. Explain in application of above principles the hydraulic press, and show how the force is multiplied. Refer to first point of lesson, and show how force *given* in one direction must always be multiplied. Finally, give short summary and recapitulate by searching questions.

LESSON ON EVAPORATION (OF WATER).

Class—Age, 15 to 16 years. *Time*—Three-quarters of an hour.

Aim—To teach chief facts connected with process, and so to lead up to lessons on rainfall and kindred subjects.

MATTER.

I. Preparation.

Water exists in three states; determining factor as to which state—heat.

If little heat (32° F., 0° C.) solid water.

If moderate heat (above 32° F., 0° C.) liquid water.

If great heat (212° F., 100° C.) gas or vapour of water.

Application of heat drives molecules apart.

II. Presentation.

1. *Definition of Process*.—General name for change from liquid to gas is—

Vaporisation, but we distinguish between { *Vaporisation at 212° F. = boiling, or ebullition, and*
Vaporisation below 212° = evaporation.

Therefore *Evaporation* is the turning of water into vapour or gas at any temperature up to 212° . It differs from ebullition, for there are no bubbles seen and no noise heard.

2. *Some Conditions which affect its rapidity* :—

(a) *Temperature of Air*. The hotter the air the greater its capacity for receiving moisture, also the greater the *rapidity* of the process.

(b) *Rapidity with which air in neighbourhood is renewed*—for air can become saturated like a sponge.

(c) *Extent of Surface exposed* also affects the rate of the evaporation, for the vapour is only derived from the *surface*, and this is one of the greatest differences between *evaporation* and *ebullition*.

III. Association.

As in procedure.



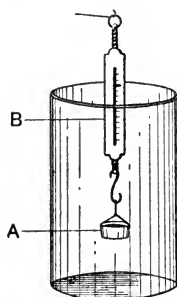
SHALLOW DISH, QUICK EVAPORATION.



NARROW-NECKED PHIAL,
SLOW EVAPORATION.

As evaporation goes on weight of A decreases, after a while it is stationary, showing evaporation has ceased. It now temperature be raised to 80° weight of A will diminish again.

Go through experiment and make class give reasons.



JAR FILLED WITH
DRY AIR AT 60° .

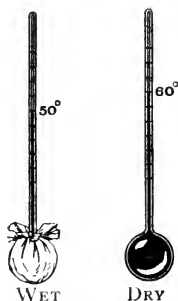
A, a capsule of water.
B, a spring balance.

IV. Application.

Effects of Evaporation :—

1. Produces *cold*, e.g., water evaporated from hand cools skin.
2. In economy of nature with condensation produces circulation of the higher and lower waters, producing *clouds* which are later condensed into rain.

Two thermometers exposed same day, and one having bulb covered by wet cloth, from which water evaporates and *lowers reading*.

**V. Recapitulation.**

By three or four questions on matter.

PROCEDURE.

I. Open lesson by a few questions to direct attention of class to the effect of heat on *water states*. If possible put a lump of ice in vessel over spirit lamp, make class note the changes that occur

in physical condition, and deduce the *only agent at work*, and therefore what must be cause.

II. 1. Refer to a saucer of water left exposed, water in flower vases, in shallow ponds, from kettle or other vessel on fire, and draw from pupils that general term is that it has *dried up* or evaporated. Make class note word *evaporated*, and lead to *vaporisation*, which is the technical or scientific term for the rapid process, *i.e.*, when the liquid boils; but as already seen not all vaporisation takes place at boiling-point; get familiar examples from class, and state that term *evaporation* is confined to the slower process that is always going on even from solids like ice and snow. Make class deduce and state the definition.

2. Question as to what sort of weather most promotes evaporation. When drying a damp towel, place near fire. Why? Vessel of water exposed to outside air on hot day—on cold day—difference? Point out double reason—(a) increase of *heat* the active agent of the change, (b) the hotter the air the more loosely its particles exist; more spongy, greater capacity. Get class to see this by referring to very hot but *humid* day—not a good drying day. The reference to a sponge will lead on to the next point—if desire to sop up water, and filled sponge is *exchanged* for a dry one, more water can be taken up, so when wind changes the layers of air resting over water the evaporation *can continue*. Thirdly, show by illustration, as on opposite page, that *extent of surface* affects the *rapidity*.

III. Use map of world, and associate regions of greatest *evaporation*, *e.g.*, Indian Ocean, off West Coast of Africa, over Central African Lakes, etc., etc., with fact of these being also regions of great heat when air *hot*, and therefore capable of taking up moisture. *Contrast* with Arctic regions; also associate with regions of very salty water, *e.g.*, Red Sea, Dead Sea, etc., etc.

Show also that from wide, shallow lakes much more evaporation than from *deep*, narrow rivers or narrow mountain lakes. *Cf.* amount evaporated from Swedish and Swiss or Scottish lakes, and get *all* reasons from class why there is a difference.

IV. Lead class to apply their knowledge of the process to its effects—ether or water on hand, the Eastern or South African water-bottle, etc., etc. The cooling of vegetation after rain or dew drops have been deposited, and so on.

Finally, apply it to the understanding of the use of the wet and dry bulb thermometer.

NOTES OF A LESSON ON THE BAROMETER (A FIRST LESSON).

Class—Age, 13 to 15 years. *Time*—Three-quarters of an hour. *Previous Knowledge*—Matter of lesson on “Pressure of Fluids”. *Aim*—To teach mode of the working of the barometer and connection between its readings and the weather, and so lead pupils to take an intelligent interest in meteorology.

MATTER.

I. Preparation.

1. Refer to fact that air is a fluid, and like all fluids presses at any given point, equally in all directions.
2. Call attention to the fact that the weight of the air is its downward pressure.
3. *Baros* = weight; *metron* = measure. Therefore lesson on the instrument which measures the weight of the air.

II. Presentation.

Torricellian Experiment.

III. Association.

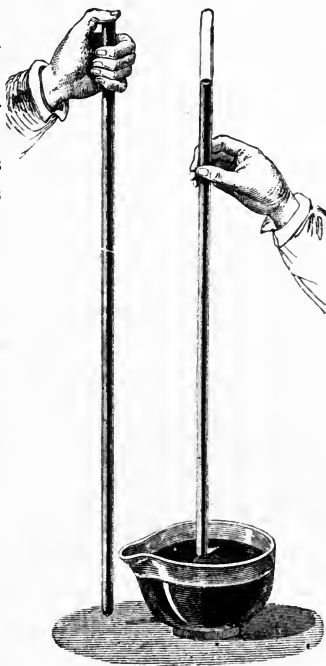
- | | | |
|---------------------------------------|---|--|
| 1. <i>Experiments.</i> | { | <p>(a) Relate history (1643), and show important parts of a mercurial barometer, <i>viz.</i>, glass tube 36 in. long, 4 in. diameter, and liquid mercury.</p> <p>(b) Perform the experiment.</p> |
| 2. <i>Deductions from Experiment.</i> | { | <p>(a) Hg is free to fall out, but does not, therefore must be supported.</p> <p>(b) Only pressure acting is that of air, therefore air supports column 33 in.</p> <p>(c) Therefore column of Hg 33 in. high = column of air, entire height.</p> |

3. *Further Deductions.*

- (a) Only a liquid would *transmit* pressure from basin.
- (b) A lighter liquid for barometer needs a longer tube.
- (c) Therefore Hg chosen, because a liquid which neither freezes nor boils easily and because of its density.

IV. *Application.*

- (a) If weight of air increases, Hg *rises*.
If weight of air decreases, Hg *falls*.
- (b) Weight of air increases when atmosphere is *cold* or *dry*, and decreases when *hot* and *damp*.
- (c) The last because watery vapour is less dense than air.
- (d) Heat not allowed to make any difference because reading always corrected to freezing-point of water.
- (e) If moisture in air, rain follows.
Therefore *low* barometer means rain, *high* barometer means fine weather.



MERCURIAL BAROMETER.

1. The Barometer a "Weather Glass".

Long foretold, long last,
Short foretold, quick past.

2. *How height is measured:—*

Here merely point out scale affixed in *inches*.
(27 or 28 rather low, 29, 30 high reading.)

V. *Recapitulation.*

Summary: The barometer is an instrument used to

measure weight of air which varies with temperature and quantity of moisture present. In general air is able to support 30 inches of mercury. Principle discovered by Torricelli in 1643. Indirectly it tells us what sort of weather to expect.

PROCEDURE.

I. Open lesson by a few questions as to the pressure of fluids, lead class to distinguish downward pressure and weight. Elicit fact that atmospheric air is a fluid and obeys laws of fluids. Ask (or give) derivation of word "barometer," and make class see it is to measure the weight of the air.

II. *Presentation.* As in matter.

III. Call attention to the fact that till 1643 nothing save the hollow spheres of Galileo had shown the air to have weight. Lead class to connect date with early years of Civil War in Charles I. in history, and so make use of association to fix date. Allow class to examine the three things needed, *viz.*, Hg, tube, and basin or cistern. Tell them the experiment to be done is *exactly* the same as that done by Torricelli: hence name. Draw from them that Hg is a metal, but in a liquid form, and is very dense and heavy in comparison to bulk. Let a few of the class feel weight of a small quantity. Dense bodies have particles *closely packed*, hence great *cohesion* and little *adhesion*. Elicit fact by questions that on this account mercury *will not wet sides of tube*. Show that this does away with friction and leaves it free to move.

When tube is filled and inverted, fix attention of class well on preliminaries by questions something as follows: How long did we say the tube is? How much is filled with Hg? Is there any air inside? Can the air press on the top (after inverted)? If I remove my finger what would happen? Why? What is pressing on surface of Hg in cistern? What property does Hg possess in regard to this pressure? If I put the open end of the tube under the surface and remove my finger the two portions of Hg will be in connection, and consequently be one mass of fluid.

Now when that happens what pressure will be *communicated* to the Hg in the tube? Will the pressure over all the surface be transmitted? Can it be? How much will be? (Here refer to pressure of hydraulic press.) Only the surface of Hg in tube, therefore if we had a much smaller or a much larger cistern it would make no difference. About how many inches has the Hg fallen? Why does not the rest fall? Show class that the tube does not touch bottom of cistern. If Hg does not fall, what keeps it up? By similar questions draw from class the deductions written in matter.

IV. Have complete barometer and show scale in inches. Tell what is considered low reading and high.

Draw from class that heat expands air, so part resting on Hg is not so heavy, also watery vapour lighter than air, so, if present, takes place of air, therefore column not so heavy. Elicit behaviour of Hg in tube, and conclude by showing how this *indirectly* tells us the weather to expect.

V. What is the barometer? Why is Hg chosen? What would be the effect of using water? Why is the reading low before rain? What does a sudden fall portend?

LESSON ON THE MECHANICAL POWERS.

Class—Oxford Seniors; age, 17 to 18 years. *Time*—Fifty minutes.
Aim—To exercise the reasoning powers of the pupils and lead them to have an intelligent and practical knowledge of the three mechanical powers applied to ordinary uses.

MATTER.

I. Preparation.

1. Definitions.

- | | | |
|---|-------------------------|--|
| { | (a) <i>Work</i> . | That which is done by force. |
| | (b) <i>Power</i> . | Name given to the applied force. |
| | (c) <i>Mechanical</i> . | Relating to a machine. |
| | (d) <i>Machine</i> . | <div style="display: inline-block; vertical-align: middle; font-size: 4em; padding: 0 10px;">{</div> A contrivance by which a force applied at one point produces work or overcomes resistance at another. |

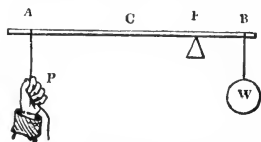
2. Use of Machines.

3. Mechanical Advantage :—

When the power applied is less than the resistance.

II. Presentation.

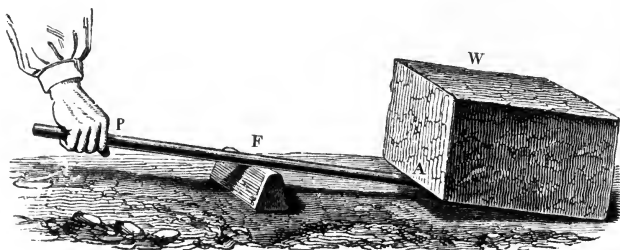
Mechanical Powers Enumerated and Described :—



LEVER OF FIRST CLASS.

I. The Lever

{ Is a rod movable about a fixed point, called a *fulcrum*.
Parts of: Two arms and fulcrum.



LEVER OF FIRST CLASS.

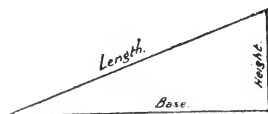
From simple experiment with different weights on a bar used as lever deduce *Conditions of Equilibrium*, i.e., that the product of the power into its distance from fulcrum = that of weight into distance.

Examples of: See-saw, common balance, poker, wheelbarrow, crowbar.

2. The Pulley : Small wheel with grooved rim fixed to a block, or suspended by a cord ; forces act on ends of a cord round it.

Deduce ; Mechanical advantages in above two illustrations.

3. Inclined Plane.



INCLINED PLANE.

<i>Advantage in General Terms.</i>	{	In raising weights, the power is diminished according as the slope is smaller and the length or distance greater.
<i>Familiar Examples.</i>		Train or horse and cart ascending mountain. Inclined path, instead of steps, in garden. Wheel barrow along a plank, etc. Principle applied to machines: The screw, the wedge.

III. Association.

Simple examples throughout lesson. Apply principle of work done remaining the same.

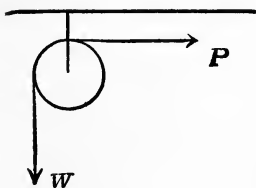


FIG. 1.

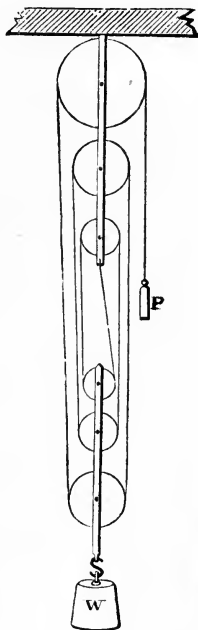


FIG. 3.

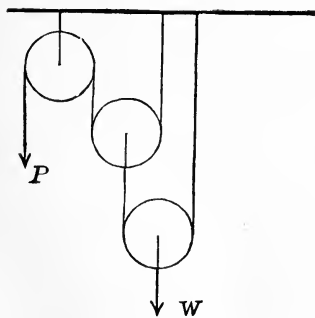


FIG. 2.

IV. Recapitulation

Of (1) definitions in lesson; (2) description of three mechanical powers.

V. Application.

Apply knowledge to lessening the difficulty in the following practical instances :—

1. Opening a nailed-down case.
2. Raising cargo on board ship.
3. Ascending Mount Cenis by rail.

PROCEDURE.

I. Introduce lesson by referring to such expressions as "One has not the *power* to do some work," and again, "One does it mechanically". What do we mean by *power* and *mechanical*? Elicit that *power* is the strength or force by which we do some work. Ask definition of *work*, and examples. Show that it often takes the form of resistance, *e.g.*, raising a weight. Lastly, ask for examples of machines. Lead class to see that such simple contrivances as pair of scissors, etc., are machines. Question as to the force applied in each case, and the work done, and show that in all of them, however complicated or simple as the case may be, there is this in common, that the force is applied at one point and work done or resistance overcome at another.

Ask the uses of machines, *e.g.*, (1) a weight drawn up an inclined plane instead of raised vertically, (2) a bicycle, (3) a poker. Point out the advantage in each case. Contrast the advantage of (2) and (3), the latter merely applying the power at a more convenient point while the former produces greater motion. Tell class that the principles on which all machines are based may be seen in their simplest forms in the three mechanical powers, the lever, the pulley, and the inclined plane.

II. 1. *Lever*.—Ask class how men sometimes move a heavy block, using an iron bar (draw diagram). By a simple experiment before the class, first without fulcrum, then with one, draw from pupils the necessary parts of a lever. Give name (*Fulcrum*). Ask what are the forces at work, as shown in diagram, and represent them as P, W and F. Give examples of the common balance, and ask which is the

power, which the weight, and where the fulcrum. Treat the see-saw in the same way. Ask what we notice about the relative lengths of the arms of the see-saw when children of same weight are on and when they are unequal. What conclusion is to be drawn? By supposing different distances and weights elicit in general terms the conditions of equilibrium. Lastly, consider the wheel-barrow as a lever, and show that both arms may be on same side of the fulcrum.

2. *Pulley*.—Call attention of class to little wheel of window cord. Ask descriptions and draw diagram, also ask what use it is. Show that, as in Fig. 1, the mechanical advantage is merely in changing the direction and lessening friction. Now draw Fig. 2. Ask how the pulleys differ here. How are the movable pulleys supported? To find out what mechanical advantage there is here. Suppose window equals weight 8 lb., how is it held up? Then each string bears half its weight, *i.e.*, the beam one and the second pulley the other. Again, this pulley is supported. How? Therefore, pulley has only quarter of weight to bear and the force is quarter the weight. What would be the effect of adding another pulley? There is a third case of pulleys, often used and to be seen in ship rigging. Draw diagram 3. Treat this case as the former to find the mechanical advantage, and compare it with Figs. 1 and 2. In both cases deduce that the work done remains the same by showing that window is raised only quarter of the distance pulley moves in second case and one-fifth in third.

3. *Inclined Plane*.—Refer to the descent to the electric railway. Why is it so made? Ask examples from class of where the inclined plane is used to raise weights impossible otherwise. Deduce from their own experience the advantage of it, and how it is increased according to the incline. Ask if principle of work being the same applies here, and why? Show a screw and ask which of the three mechanical powers acts in it. Recapitulate the matter briefly, and ask pupils how they would apply their knowledge practically to the instances mentioned in application.

LESSON ON THE PRINCIPLE OF ARCHIMEDES.

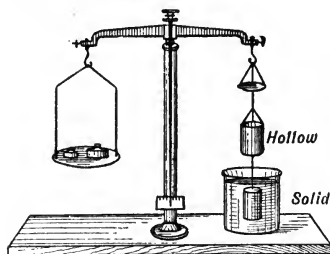
Class—Age, 15 to 17. *Time*—Forty minutes. *Previous Knowledge*—Laws of pressure of fluids. *Aim*—To exercise the reasoning powers of the pupils in teaching them the principle and leading them to deduce its application to floating bodies.

MATTER.

I. Preparation.

Story of Archimedes and Hiero of Syracuse very briefly told.

II. Presentation.



HYDROSTATIC BALANCE.

- i. Experiment.
- (a) Weigh two cylinders out of water.
 - (b) Immerse solid in water and weigh the two cylinders.
 - (c) Lastly, fill hollow cylinder with water.

Results noticed. { 1. After (b) found lighter.
2. After (c) weight same as before.

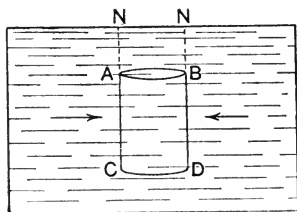
Conclusions :—

Apparent loss of weight after (b).

This loss { = weight of equal volume of water to solid.
= weight of water displaced.

Principle stated : A solid immersed in a fluid loses as much of its weight as is equal to the weight of the fluid displaced.

Proof of the Principle :—



ABCD = body in equilibrium.
Therefore all pressures are equal.

But side pressures are equal to opposite, therefore counter-balance.

Downward pressure = column of water ANNB + weight of body.

Upward pressure = column of water CNND.

Therefore ANNB + weight = column of water CNND.

Take away column ANNB from each and weight = column of water CABD.

Take away column ANNB from each and weight = column of water equal to weight of water displaced.

III. Association.

1. Draw from class how Archimedes tested the gold crown of Hiero, or how purity of any substance could be tested.

2. Why some bodies float and others sink.

IV. Recapitulation

Of the principle and how it is demonstrated.

V. Application.

"A ship is said to draw more water in a river than at sea." What is the reason?

PROCEDURE.

I. Introduce lesson by *briefly* telling class the story of Archimedes. *Who he was.* One of the most renowned of ancient mathematicians, who lived in Syracuse (ask where it is, and what now called) under the tyrant Hiero, about the beginning of third century B.C. *What Hiero asked him to do.* To test purity of gold crown without injuring it. His perplexity. How and when he got the clue to his work. Leave Archimedes and return to the question of the crown at the end of lesson, when class will be able to follow up his clue to solving the difficulty.

II. Now perform the experiment 1 as described in matter. Weigh an object out of water and then in water. Ask what difference is noticed. Again do the same with some object of same weight but differing in bulk. Compare results, and deduce that when the bulk is greater the difference of the weight in and out of water is greater, finally perform experiment with balance. Elicit results and draw the conclusions from class and state them in form of principle.

Let class apply knowledge of the pressure of fluids to account for this fact and prove the principle. Suppose a cylinder ABCD is immersed in water and is in equilibrium, what do we know of the pressures on all sides? Consider them separately. What pressure acts on sides, and how?—equal and opposite. What is the downward pressure of the water? Is there any other downward pressure besides? (Weight of body.) What counterbalances this downward pressure? What is the upward pressure due to? Take away the column ANND common to both. What pressure is equal to the weight? Call attention to fact that this is only true when body is in equilibrium or *at rest*. Return to experiment, and apply the above and explain that the amount, as body is lightened in water, depends on its bulk.

III. Also refer to floating bodies, and ask class to account for it.

IV. Recapitulate the principle and show how it is demonstrated. Conclude lesson by returning to Archimedes and the crown, and elicit from class how he discovered the fraud. And lastly, give the question in application, and let class discover the explanation and tell it later.

LESSON ON A PROBLEM IN GEOMETRY.

Class—Age, 14 to 16 years. *Time*—Half an hour. *Aim*—To exercise reasoning power of class in leading them to apply their previous knowledge of Geometry to solve the problem, thus to strengthen their powers of concentration.

MATTER.

I. Preparation.

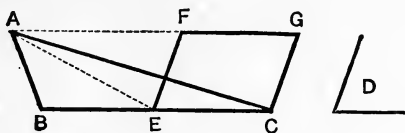
1. *Problem* : Something is to be *done*.
2. *Enunciation* : To construct a parallelogram equal to a given triangle having one angle equal to a given angle.
3. *Definitions* : Triangle and parallelogram.
4. *Two kinds of Equality* : Identical and in area.
5. *Relation between* parallelogram and triangle.

II. Presentation.

1. *Given* : A triangle ABC and an angle D.

Required : To construct a parallelogram equal to a triangle ABC having one angle equal to angle D.

2. *Construction*.



- Points.* $\left\{ \begin{array}{l} (a) \text{ Bisect } BC \text{ at } E. \\ (b) \text{ At } E \text{ make angle } CEF \text{ equal to angle } D. \\ (c) \text{ Through } A \text{ draw } AFG \text{ parallel to } BC. \\ (d) \text{ Through } C \text{ draw } CG \text{ parallel to } EF. \end{array} \right.$

Then shall EFGC be required parallelogram. Join AE.

III. Association.

Proof : Triangle ABE = triangle AEC, therefore triangle ABC = double triangle AEC. But parallelogram EFGC = double triangle AEC. Therefore parallelogram EFGC = triangle ABC, and it has angle FEC = angle D (Construction).—(Q.E.F.)

IV. Recapitulation.

What is required in this problem? What are the three points in construction? Go through the whole construction and proof again with assistance of class.

V. Application.

Erase work on board and require class to write out the proposition with different letters and a triangle and angle of different shape.

BLACKBOARD SKETCH: As in Presentation and Association.

PROCEDURE.

I. Introduce lesson by asking distinction between *Problem* and *Theorem*. Read enunciation. To which class of proposition does it belong? Why? What are we asked to do? What is a triangle? What is a parallelogram? In how many ways may triangles and parallelograms be equal? Which propositions treat of parallelograms equal in area? What theorem do you know which connects areas of triangles with those of parallelograms on same base?

II. 1. Read enunciation again, and get class to put it in form of *given* and *required*, and write this on blackboard.

2. *Construction*. You have just said that the parallelogram is *double* the triangle. Now in this proposition we want the parallelogram to be *equal* to the triangle. How much of it will it then be double of?—(halt). How then can we find half the triangle ABC? If I bisect base BC at E and join EA, what do we know of the two triangles? Why? Now on what conditions will a parallelogram be double of triangle AEC? (On same base and between same parallels.) Can any one suggest how to fulfil these conditions? Suppose we draw parallel to BC a line through A and one through E parallel to AE. Have we fulfilled the conditions for having a triangle equal to a parallelogram? (Yes.) But have we done all that was asked? (No.) What is not done? (Angle = angle D.) Clearly then we must try again. How do we make an angle equal to a given angle? Now our parallelogram is going to be on EC. Where then must the given angle be? (At E or C.) Now try the construction again. Draw from class points 1, 2 and 3, and ask again if parallelogram EFGC answers all requirements.

III. What is noticeable about proofs of problems? Generally easy and apparent. We want to prove parallelogram = triangle ABC. What is equal to triangle AEC? How do you know? Is any other figure connected with it? (Parallelogram double.) What proposition proves this?

But you have said that triangle $ABC = \text{double triangle } AEC$, and parallelogram is also double of triangle AEC . What is the conclusion? And what about angle $=$ to D ? Then we may write *Q.E.F.*

- | | |
|----------------------------|-----------------|
| IV. <i>Recapitulation.</i> | } As in matter. |
| V. <i>Application.</i> | |

LESSON ON PYTHAGORAS' THEOREM.

Class—Oxford Junior Division. *Time*—Half an hour. *Aim*—To exercise judgment and reason of the class in deducing proof of Proposition.

MATTER.

I. Preparation.

1. *Enunciation.* In a right-angled triangle the square described on the hypotenuse is equal to the sum of the squares described on the other two sides.

- | | |
|-------------------------------------|--|
| 2. <i>Definitions</i> to be stated. | $\left\{ \begin{array}{l} (a) \text{ Right angle.} \\ (b) \text{ Triangle.} \\ (c) \text{ Right-angled triangle.} \\ (d) \text{ Square.} \\ (e) \text{ Hypotenuse.} \end{array} \right.$ |
| | |
| | |
| | |
| | |

II. Presentation.

1. *Analysis of Enunciation.*

Given	$\left\{ \begin{array}{l} \text{Right-angled triangle.} \\ \text{Square described on hypotenuse.} \\ \text{Squares described on sides.} \end{array} \right.$	

Required to be proved.	$\left\{ \begin{array}{l} \text{Square on hypo-} \\ \text{tenuse} = \end{array} \right.$	$\left\{ \begin{array}{l} \text{sum of square on other} \\ \text{sides.} \end{array} \right.$
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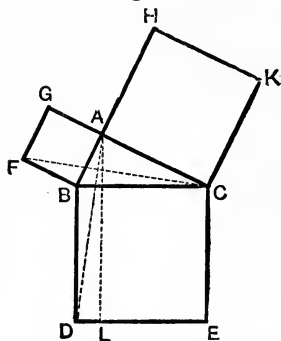
2. *Construction.*

On BC describe square $BDEC$, and on BA , AC describe the squares $BAGF$, $ACKH$.

Through A draw AL parallel to BD or CE . Join AD , FC .

3. *Proof.*

(a) Because each of angles BAC and BAG is a right angle, therefore CA, AG are in same straight line.



Now angle CBD = angle FBA, for each of them is a right angle. Add to each angle ABC, then angle ABD = angle FBC.

(b) Then in triangles ABD and FBC, because $AB = FB$, $BD = BC$, and angle ABD = angle FBC, therefore triangle ABD = triangle FBC.

(c) Now parallelogram BL is double of triangle ABD, because they are on same base, BD, and between same parallels, BD and AL. And square GB is double of triangle FBC, for they are on same base FB and between same parallels FB and CG. But doubles of equals are equal (Axiom 6). Therefore parallelogram BL = square GB.

(d) In a similar way by joining AE, BK, it can be shown that parallelogram CL is equal to square CH, therefore whole square BE = sum of squares GB, HC—that is, square on hypotenuse BC = sum of squares described on two sides BA, AC.—(Q.E.D.)

III. Association.

Propositions, etc., used in proof.

IV. Recapitulation.

1. Repetition of proof by class.
2. Each step analysed.

V. Application.

1. Deduce principle.
2. Prove in numbers.
3. Value in finding areas and distances

PROCEDURE.

I. Write enunciation on blackboard. Make the class read it. Pick out terms and question as to definition of right angle, triangle, right-angled triangle, square and hypotenuse. What points have been already proved with regard to a single triangle? But this is the first mention of a right-angled triangle.

II. Read enunciation again, and ask what is given. Right-angled triangle (therefore important to remember the right angle). Squares described on lines by what proposition? What is a square? But what other class of figures may a square come under? Why is it a parallelogram also? Make class notice that these squares may be called parallelograms too. What is required to be proved? Is this a problem or a theorem? Why? In mensuration what name is given to "square on side"? Area of square? And it is the sum of areas which is to equal square on BC.

Now as lesson deals with squares we must make them. Where? Now draw line AL. What is it parallel to? (Question the class as to the figures into which the square BCED is now divided by AL.) Call attention to joining lines, and deduce what figures they make (triangles), and with what lines. Notice results obtained.

Point out division of square BCED, and probable reason of this division. Have we learnt any way of finding out an equality in area between triangles and parallelograms already? So if I could get one of the triangles equal to a square, and then equal to part of the big square BCED, it would be easy to prove. Look at the two triangles again and see if we cannot make them equal in all respects. What is necessary for this equality? (See which of the conditions for equality are most nearly fulfilled.) We have two sides equal to two sides. Now let us examine the angles. What is angle FBC made up of, and angle ABD? Therefore we can say angle FBC equals angle ABD; therefore our two triangles

are equal. Now notice the position of these triangles as regards parallelograms. But am I sure that GAC is parallel to FB ? What part of it am I certain of?— GA . What part must I prove?— AC . What proposition proves that two lines are in one and same straight lines, *or* what conditions are necessary to bring this about? But what do I know about the angles at A ? Therefore GA and AC are in one and same straight line.

Now we have proved our triangles on equal bases and between same parallels as two parallelograms. What follows? By what proposition? Therefore doubles of equal are equal by what axiom? But how much have we proved so far? How much is there still to prove? Could this be done easily? How? When a similar proof is possible is it necessary to work it out? Why not? Therefore, what may we say to finish proof?

III. *Association.* As in matter.

IV. Recapitulate construction and proof in correct order, asking references and making class account for them.

V. Refer to area of squares, and ask how to find length of side. Show in numbers that principle is true. 4, 3, 5, etc. Show by questioning the class how this may become useful in arithmetic, finding areas and distances, etc., etc.

LESSON ON A THEOREM IN GEOMETRY.

Class—Age 13 to 15 years. *Time*—Half an hour. *Aim*—Exercise of reasoning to lead class to discover proof of this theorem.

MATTER.

I. Preparation.

1. *Enunciation*: "If a side of a triangle be produced then the exterior angle, is equal to the sum of the interior and opposite angles, and the three interior angles are together equal to two right angles."

2. *Definitions* to be stated. $\left\{ \begin{array}{l} \text{Triangle.} \\ \text{Angle, exterior angle.} \\ \text{Interior opposite angle.} \\ \text{Right angle.} \end{array} \right.$

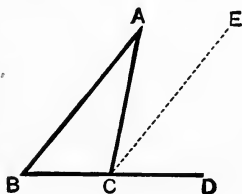
II. Presentation.

1. *Analysis of Enunciation.* $\left\{ \begin{array}{l} \text{Given : Triangle and produced side.} \\ \text{Required to prove } \left\{ \begin{array}{l} (a) \text{ Exterior angle} = \text{sum of interior and opposite angles.} \\ (b) \text{ Three interior angles} = \text{two right angles.} \end{array} \right. \end{array} \right.$

2. Construction.

Through C draw CE parallel to BA.

3. *Proof.* $\left\{ \begin{array}{l} (a) \text{ Because BA and CE are parallel and AC meets them, therefore angle ACE = alternate angle CAB. Again, because BA and CE are parallel and BD meets them, therefore exterior angle ECD = opposite interior angle ABC; therefore whole exterior angle ACD = sum of interior opposite angle CAB and angle ABC.} \\ (b) \text{ Since angle ACD = angle CAB + angle ABC proved, to each add angle BCA, then angle BCA + angle ACD = angle BCA + angle CAB + angle ABC. But adjacent angles BCA and ACD are together equal to two right angles. Therefore also angle BCA + angle CAB + angle ABC = two right angles. —(Q.E.D.)} \end{array} \right.$



III. Association.

Definitions, axioms, references.

IV. Recapitulation.

Repetition of proof by class orally.

Each step analysed.

V. Application.

1. Deduce from proposition :—

“In any right-angled triangle the two acute angles are complementary.”

2. Proposition written out by class.

PROCEDURE.

I. Read enunciation off blackboard. Ask definitions of triangle, angle, exterior angle. What other proposition has to do with exterior angle? What is meant by interior opposite angle? Define a right angle. By what proposition do we draw a line at right angles to another line? Is this proposition a problem or theorem? Why is it a theorem? What other propositions deal with right angles? With angles in a triangle?

Make the class read enunciation and point out what is given. What is meaning of produced side? (Write *given* on blackboard.) Now what is required? Two things. Exterior angle equal sum of opposite interior angles. What else is required to be proved? What do we know already about two interior angles of a triangle?

II. Draw construction on blackboard: Draw CE parallel to AB. What is our next step? Proof. What have I added to our *given* to help us in the proof? CE parallel to BA. What proposition has parallel lines given in it? What is proved from them? Exterior angle equal to opposite interior angle; also alternate angles equal; also two interior angles equal to two right angles.

What line meets parallel lines here? Which are alternate angles then? From this we see that a part of angle ACD is equal to angle BAC; now what have we to prove still to complete the matter required? Angle ECD equals angle ABC. Have these angles any connection? Why? By what proposition are they equal? (Write two statements on blackboard.) What can we conclude from these two statements? (Write final statement on blackboard.)

What is the second thing we have to prove? What proposition deals with two right angles? What line in this figure makes angles with DB equal to two right angles?

What are these angles made up of? Angle ECD + angle ECA + angle ACB . But what do we already know about angle ECD and angle ECA ? They are equal to angle CAB + angle ABC ; therefore if I add ACB to each, why will results be equal? Therefore if angle ECD + angle ECA + angle ACB equal two right angles, what else must equal two right angles? (Write statements on blackboard.)

III. *Association.* As in matter.

IV. Efface statements on blackboard and construct figure again, using different letters. Let class give steps this time. After each, ask why do we take this particular angle, etc. Make the class state enunciation of any proposition referred to.

V. Draw a right-angled triangle on blackboard, and ask class how many right angles are contained by interior angles of this triangle. If one is a right angle, what do we know about the other two? They must together equal a right angle. What do we say two angles are to one another when together they make two right angles?

Then from this theorem we can make one deduction. State it. (Write on blackboard.)

Make class write out the theorem.

NOTES OF A LESSON ON A RIDER IN GEOMETRY.

Class—Average age, 15. *Time*—Half an hour. *Aim*—To exercise the reasoning powers of the pupils and train them to accuracy of judgment by leading them to deduce the solution of the following rider.

MATTER.

I. Preparation.

BLACKBOARD ILLUSTRATIONS.

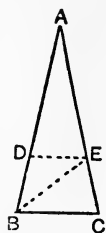
Given an isosceles triangle ABC .

Enunciation	ana-	{	Required to draw a straight line DE parallel to BC , meeting the equal sides at D and E , so that the lines DE , DB and EC are all equal.
	lysed.		

II. Presentation.

1. Make DE as required and work backwards to arrive at steps of construction.

If $DE = DB$ then triangle DBE is isosceles, therefore angle DBE = angle DEB. But because it is parallel to BC and BE meets them, therefore angle DEB = angle EBC. Therefore angle DBE = angle EBC.



2. Construction.

Bisect angle DBC by BE meeting AC at E. Through E draw ED parallel to BC. Then shall $DE = DB$ and EC .

3. Proof: (a) To prove $DB = DE$.

Because DE is parallel to BC and BE meets them, angle DEB = angle EBC. But angle DBE = angle EBC (Construction), therefore angle DEB = angle DBE; therefore triangle BDE is isosceles and $DB = DE$.

- (b) To prove $EC = DB$.

Because DE is parallel to BC and lines AB and AC meet them, angle ADE = angle ABC, and angle AED = angle ACB.

But because triangle ABC is isosceles, angle ABC = angle ACB; therefore angle ADE = angle AED; therefore $AD = AE$.

III. Association.

Properties of parallel lines and isosceles triangles. Definitions, isosceles and parallels.

IV. Recapitulation.

Question briefly as to the steps in construction and proof, and because $AB = AC$ and $AD = AE$, therefore $DB = EC$.

Thus it has been proved that BD , DE and EC are equal, and DE was drawn parallel to BC .—(*Q.E.F.*)

PROCEDURE.

I. Question as to what sides and angles are equal in ABC .

By what proposition do we draw a line parallel to BC ?

II. Only difficulty is to find the point E , such that the lines required shall be equal. We can arrive at this by supposing the line DE drawn as required and see what follows, thus obtaining a clue to how to find E . Join EB . In triangle DBE what two lines are equal?

What angles are equal in consequence?

What do you know about angles made by parallel lines?

Apply this to BC and DE , because EB meets them.

Therefore what relation exists between angle DBE and angle EBC ?

This gives us clue required to find point E .

What must be done to the angle DBC ?

What then shall our construction be?

What previous propositions are used in it?

What remains now to be proved?

(3) (a) To prove $DB = DE$ we need only use what we already discovered in seeking the construction. Go through steps as in (a), reversing the order.

(b) What still remains to be proved?

What do we know of triangle ABC ?

If we can prove triangle ADE also isosceles, what follows as to DB and EC ?

To do this what must be proved equal?

Prove angles equal to those at B and C . What follows with regard to each other? Why? What is our last step then to prove $DB = EC$?

How do we know that it is equal also to DE ? What were we asked to prove? Is it done?

III. *Association.*

IV. *Recapitulation.* { As in matter.

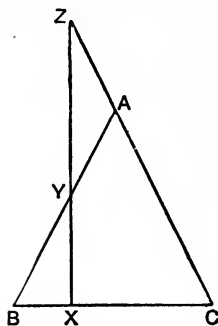
LESSON ON A RIDER IN GEOMETRY.

Class—Age, 14 to 16. *Time*—Half an hour. *Aim*—To exercise the reasoning powers of the class, and lead them by analysis and synthesis.

I. Preparation.

MATTER.

1. *Problem.* From X, a point in the base BC of an isosceles triangle ABC, a straight line is drawn at right angles to the base, cutting AB in Y, and CA produced in Z; show that the triangle AYZ is isosceles.



2. *Definitions.* { Point. Triangle.
Isosceles triangle.
Straight line.
Line produced "at right angles".

II. Presentation.

1. Construction of figure.

2. Analysis of enunciation.

Given. { AC = AB and angle ACB = angle ABC.
Angle ZXB and angle ZXC are right angles.

(b) Required to prove. { Triangle AZY is isosceles, \therefore { AY = AZ.
Angle AZY = angle AYZ.

3. If triangle AYZ is isosceles, then

{ AZ = AY.
Angle AZY = angle AYZ.

4. *Proof.*

In triangles YXB and XZC.

Because angle ZXC = angle YXB, and angle ZCX = angle YBX by construction.

Therefore remaining angle XYB = angle XZC.

But angle XYB = angle ZYA.

Therefore angle XZC = angle ZYA.

That is, angle YZA = angle ZYA.

Therefore $ZA = YA$.

Therefore triangle AZY is isosceles.—(*Q.E.D.*)

III. Association.

Propositions, etc., of proof.

IV. Recapitulation.

Repeat proof with different letters.

Each step to be accounted for.

V. Application.

Rider written out by the class without any help from blackboard.

PROCEDURE.

I. Read enunciation and ask definitions of point, triangle and isosceles triangle. What proposition have we dealing with isosceles triangles? Define a straight line. Line produced at right angles. What does produce a line mean? And at right angles? Is this a problem or a theorem? Why a theorem?

II. Make class help in construction of the figure. Read enunciation again and ask what is given. An isosceles triangle. What can we know from this? That angle $ACB = \text{angle } ABC$, and that $AC = AB$. Are any other angles that are given equal? Angle $ZXB = \text{angle } ZXC$.

What is required? To prove that AZY is an isosceles triangle. Assuming that AZY is isosceles, what conditions must be present?

AY must $= AZ$, and angle $AZY = \text{angle } AYZ$.

What must I aim at in my proof? To prove either of these conditions.

We shall try first if we can prove $AZ = AY$. Can we see any other lines equal to either of these? Are there triangles anywhere in figure that may be equal in all respects? So we cannot succeed by thinking of the lines first. What other condition can we aim at proving? Angle $AZY = AYZ$.

How many triangles can you discover in the figure?

Name any two that have one *angle* alike in each. Triangle CZX and triangle YBX have angle YBX = angle ZCX, because ABC is isosceles. What sort of angles have we at X? Two right angles. So now we have discovered that the triangles ZXC and YBX have two angles in each equal to one another. (Write down this statement.) What do we know about the sum of the three angles of a triangle? What can we conclude from this? That remaining angles must be equal. Name the remaining angles. Angle XZC and angle BYX. Is it necessary that the sides of triangles should be equal to have *angles* equal? Why not? Now we have proved one of our angles, angle AZY, equal to something; what have we still to make it equal to? Can you find any other angle equal to angle BYX? Very near it. Angle ZYA. Why? Because it is vertically opposite. By what proposition? (Write statement on blackboard.) What can we deduce now? Angle XZC = angle ZYA, and from that what kind of triangle must AZY be? Why? And by what proposition?

III. *Association*. As in matter.

IV. Repeat same sides with different letters and let pupils give steps and reasons for each. How many propositions have we used to prove the rider? How many and what axioms? What definitions are included in its enunciation?

LESSON ON PROFIT AND LOSS.

Class—Oxford Junior. *Time*—Half an hour. *Aim*—To exercise the reason and judgment of the class in recognising the principle of profit and loss.

MATTER.

I. Preparation.

- | | | |
|-------------------|---|--|
| 1. <i>Terms</i> . | { | <i>Profit</i> = gain on cost price.
<i>Loss</i> = loss on cost price.
Therefore selling price at a <i>gain</i> = cost price + profit.
Selling price at a <i>loss</i> = cost price - loss. |
|-------------------|---|--|

2. *Easy Oral Examples.* { (a) If cost price is £12 and selling price £15 10s.
 (b) If cost price is £12 and selling price £9 10s.
 (c) If gain is £3 and selling price is £18 10s.
 (d) If loss is £2 and selling price is £10.

II. Presentation.

1. Gain or loss is always reckoned by per cent.
2. Seventeen per cent. *gain* means that if cost price = 100, then selling price = 100 + 17.
3. Seventeen per cent. *loss* means that if cost price = 100, then selling price = 100 - 17.

Therefore *cost price* may *always be* represented by 100.

- Easy Examples.* { 1. If I buy for £100 and sell for £120, what is gain per cent. ?
 2. If I buy for £100 and sell for £75, what is loss per cent. ?
 3. What is gain per cent. if I sell for £105 what I bought for £100 ?
 4. What is loss per cent. if I sell for £92 what I bought for £100 ?

III. Association.

Questions in procedure.

IV. Recapitulation.

1. Terms and their meaning
2. Representative price.

V. Application.

Problem.

1. Goods bought for £1 are sold for £1 2s., what is the gain per cent. ?

$$\begin{aligned}\text{Gain} &= \text{selling price} - \text{cost price} \\ &= £1 \text{ 2s.} - £1 \\ &= 2\text{s.}\end{aligned}$$

Therefore gain on £1 or 20s. = 2s.

Given : Gain on 20s. = 2s.

Required : Gain on 100 = ?

$$20\text{s.} : 100\text{s.} :: 2\text{s.} : ?$$

$$\frac{100 \times 2}{20} = 10 \text{ per cent. } \textit{Ans.}$$

2. Same problem, but reverse prices to make loss.

BLACKBOARD SKETCH OF PRECEDING LESSON.

1. *Terms.* $\left\{ \begin{array}{l} \text{Profit} = \text{gain on cost price.} \\ \text{Loss} = \text{loss on cost price. Therefore} \\ \text{selling price at gain} = \text{cost price} + \\ \text{profit.} \\ \text{Selling price at loss} = \text{cost price} - \text{loss.} \end{array} \right.$
2. Cost price *always* represented by 100.
3. Problem worked out as in matter.

PROCEDURE.

I. Question the class as to name given to gain on any selling transaction. And loss. What is the gain always counted upon? And the loss? To discover the gain or loss what must be considered first? Now if I sell at a gain what is my selling price made up of? If I sell at a loss what is my selling price made up of? (Here give some easy oral examples, such as to test whether the class understand the meaning of terms and the parts of a selling price in cases of gain and loss.)

II. Now as in the brokerage of stocks, and in all cases of commission, etc., gain or loss is always reckoned by per cent. What is the meaning of per cent.? Now when I apply per cent. to gain, and say, for instance, that the gain in a certain transaction is 17 per cent., I mean that in every £100 I have gained £17, that is, that what I bought for £100 I sell for £117. Which is cost price here and which selling price? What is selling price £117 made up of?

In the same way, if I say that a sale has been made at a loss of 17 per cent. I mean that what I bought for £100 I sold at £100 less £17. We must notice here a very important point, that the cost price in both cases is £100 and may always be represented by 100, and the gain or loss is either more or less than the 100, but *never* represented by the 100 itself. (Here give examples to find out loss and gain per cent.)

III. Recapitulate terms and their meaning, also the point that representative of cost price is always 100.

IV. Write problem on the blackboard and question as to how to find gain (apart from per cent.) by subtraction of cost price from selling price. What is the gain *on*? And is this selling price or cost price? What are we asked to find? Now what is *given* and what *required* in this problem? State by proportion and put in fractional form.

(Same problem reversed to show loss per cent.) Make the class work on blackboard, and state steps, giving reasons and analysis of each point in the course of the working.

LESSON ON CLOCKS AND TIME.

Class—Oxford Junior. *Time*—Half an hour. *Previous Knowledge*—Ratio and double rule of three. *Illustration*—Clock. *Aim*—To exercise the reason and judgment of the class in discovering the principle of relative motion as applied to clocks.

MATTER.

I. Preparation.

Action of hands of a clock.	{	<i>Minute hand</i> : 60 minute divisions in 1 hour.
		<i>Hour hand</i> : 5 minute divisions in 1 hour.
		<i>Relative motion</i> : Minute hand moves 60 minute divisions while hour hand moves 5; therefore gains 55 minute divisions in 60 minutes' time.

II. Presentation.

Write problem on board to give point to what follows:—

<i>Principle Deduced.</i>	{	1. When hour hand goes 1 minute division, then minute hand goes 12.
		2. Therefore gain of minute hand = 11 minute divisions in 12 minutes' time.

Relative motion of minute hand = 11 minute divisions in
12 minutes' time.

III. Association.

1. Compare speed of two bodies moving in same direction.
2. *Relative* rate is difference between *actual* rates.
3. Trains, races, walking.
4. If *no* difference then *no* relative movement.

IV. Application.

Problem : At what time between 4 and 5 o'clock will the hands of a watch be (1) together, (2) opposite each other, (3) at right angles.

1. *Together.* $\left\{ \begin{array}{l} (a) \text{ Position at 4 o'clock.} \\ (b) \text{ Number of minute divisions to be gained} = 20. \end{array} \right.$

Given : 11 minute divisions gained in 12 minutes.

Required : 20 minute divisions gained in ? minutes.

$$11 \text{ min. div.} : 20 \text{ min. div.} :: 12 \text{ min.} : ?$$

$$\frac{20 \times 12}{11} = 21\frac{9}{11} \text{ minutes past 4. } \textit{Ans.}$$

2. *Opposite each other.* $\left\{ \begin{array}{l} (a) \text{ Position at 4 o'clock.} \\ (b) \text{ Number of minute divisions to be gained} = 50. \end{array} \right.$

Given : 11 minute divisions gained in 12 minutes.

Required : 50 minute divisions gained in ? minutes.

$$11 \text{ min. div.} : 50 \text{ min. div.} :: 12 \text{ min.} : ?$$

$$\frac{50 \times 12}{11} = 54\frac{6}{11} \text{ min. past 4, or } 5\frac{5}{11} \text{ min. to 5. } \textit{Ans.}$$

3. *At right angles.* $\left\{ \begin{array}{l} (a) \text{ Position at 4 o'clock.} \\ (b) \text{ Number of minute divisions to be gained} = 5 \text{ or } 25. \end{array} \right.$

Given : 11 minute divisions gained in 12 minutes.

Required : 5 minute divisions gained in ? minutes.

$$11 \text{ min. div.} : 5 \text{ min. div.} :: 12 \text{ min.} : ?$$

$$\frac{5 \times 12}{11} = 5\frac{5}{11} \text{ minutes past 4. } \textit{Ans.}$$

Note.—Similar problem given as exercise to pupils.

PROCEDURE.

- | | | |
|------------------------------|---|---------------------------------|
| 1. 1. Train 60 miles an hour | $\left\{ \begin{array}{l} \text{On parallel lines.} \end{array} \right\}$ | No relative motion. Why? |
| 2. Train 60 miles an hour | | |
| 1. Train 60 miles an hour | $\left\{ \begin{array}{l} \text{On parallel lines.} \end{array} \right\}$ | Relative rate of 20 miles. Why? |
| 2. Train 40 miles an hour | | |

What is relative movement, relative rate, actual rate?

II. Examine clock face; work done in an hour by *minute hand*, 60 "minute divisions"; by *hour hand*, 5 "minute divisions". What is relative motion, work or space covered by minute hand?—55 minute divisions. In what time?—1 hour, or 60 minutes. 55 minute divisions in 60 minutes; therefore 11 minute divisions in 12 minutes. Therefore *relative motion of minute hand = 11 minute divisions in 12 minutes of time.*

III. How do we find relative movement? What is it the difference between? How many things must be moving in same direction to have relative movement? Why? If there is no difference in the rates is there any relative movement? Why not? (Here give some examples of trains, races, walking.)

IV. What is the position of hands at four o'clock? How far has the minute hand to go before it overtakes the hour hand? What is relative movement of minute hand? How much does it gain in one hour on hour hand? In one-third of that time what does it gain? Gain of hour hand equals 11 minute divisions in 12 minutes. What do we know then in this problem? What is required to be stated? Statement by ratio and fractions and answer. (Make the class work on blackboard.)

(2) What is the position of hands at four o'clock? What will be the position when opposite each other? How many minute divisions has minute hand to gain? How much

did we find out it gained in 12 minutes? What is given therefore? What required? (Work sum by ratio and fractions.)

What is the meaning of "at right angles"? What will position of hands be then? How much has minute hand to gain on hour hand? What is relative movement of minute hand? Why do I not say 12 minute divisions in 12 minutes? What must I say? Why? What is given? Required? (Work out sum.) Give a problem to be done in exercise books.

LESSON ON BROKERAGE (STOCKS).

Class—Oxford Junior Division. *Time*—Half an hour. *Previous Knowledge*—Buying and selling of stocks. *Aim*—To exercise the reason and judgment in the treatment of brokerage in problems in stocks and shares.

MATTER.

I. Preparation.

1. Refer to buying and selling of stocks.
2. Refer to terms, money, stock, price of stock, etc.

Familiar Examples to teach commission, etc. {

1. Buy a book and pay postage and carriage. Real cost = price of book + postage.
2. Commercial traveller and commission.
3. Income-tax subtracted before income given, etc.

II. Presentation.

1. *Broker* { = one who does business of buying and selling.
2. *Brokerage.* {
 - (a) Payment made for business done.
 - (b) Always reckoned per cent., and generally $\frac{1}{2}$ per cent. on every £100 stock.
3. *Two Cases.* {
 - (a) *Buying* stock. Real price = nominal price + brokerage.
 - (b) *Selling* stock. Price received = nominal price - brokerage.

4. *Easy Examples.* $\left\{ \begin{array}{l} (a) \text{ What is real price of stock at } 98\frac{3}{4} \\ \text{when brokerage is } \frac{1}{2} \text{ per cent. ?} \\ (b) \text{ What is real price received for stock} \\ \text{at } 98\frac{3}{4} \text{ when brokerage is } \frac{1}{2} \text{ per} \\ \text{cent. ?} \end{array} \right.$

III. Recapitulation

Of familiar examples : terms and two cases.

IV. Application.

Problem.

1. What sum will buy £10,000 stock at $75\frac{3}{4}$, brokerage being $\frac{1}{2}$ per cent. ?

$$\begin{aligned} \text{Real price of stock} &= 75\frac{3}{4} + \frac{1}{2}. \\ &= 75\frac{1}{2} \end{aligned}$$

Given : £100 stock costs $75\frac{1}{2}$.

Required : £10,000 stock costs ?

$$£100 : £10,000 :: £75\frac{1}{2} : ?$$

$$\frac{10000}{100} \times \frac{151}{2} = £7,550. \text{ Ans.}$$

2. What sum will I receive for the sale of £12,000 stock at $96\frac{3}{4}$, brokerage being $\frac{1}{2}$ per cent. ?

$$\begin{aligned} \text{Real price received for } £100 \text{ stock} &= 96\frac{3}{4} - \frac{1}{2}. \\ &= 96\frac{1}{4}. \end{aligned}$$

Therefore given : £100 stock will receive $96\frac{1}{4}$.

Required : £12,000 stock will receive ?

$$£100 : £12,000 :: £96\frac{1}{4} : ?$$

$$\frac{12000}{100} \times \frac{385}{4} = £11,550. \text{ Ans.}$$

Note.—Similar problems given as exercise to the pupils.

BLACKBOARD SKETCH OF PRECEDING LESSON.

Broker. One who does the business.

Brokerage. Payment made for business done.

$$\text{Two Cases.} \quad \left\{ \begin{array}{l} \text{Buying.} \quad \text{Real price} = \text{price} + \text{broker-} \\ \quad \quad \quad \text{age.} \\ \text{Selling.} \quad \text{Price received} = \text{price} - \text{broker-} \\ \quad \quad \quad \text{age.} \end{array} \right.$$

Write out two problems in full as in the matter,

PROCEDURE.

I. Question the class on problems already worked on buying and selling of stock. When I buy stock what must I take into consideration? When I sell what must I remember? What is the real value of each £100 share of stock? When is stock said to be at par? At a discount? Now in all matters of buying and selling the actual cost of a thing is the price + extra expenses—a book and postage, a railway journey and porter, a postal order and the penny. The same way in profit or gain when selling. Cost price and cost of packing, or perhaps postage, has to be deducted before I can count clear gain.

II. Now in the stock buying and selling the actual work is not done by each individual, but through the hands of men who are called stockbrokers, and who earn their living and income by doing business for other people. This is not done for nothing, and each share that is bought or sold by a stockbroker has to be paid for to the broker in return for his services. The amount paid on each share is called *brokerage*, and the man who performs the business the *broker*. This payment is always reckoned $\frac{1}{8}$ of £ per cent. on each share.

Now, what are the two things it is the broker's business to do first? We shall take each separately: first the case of buying. Supposing I want one share only, what have I to give the broker? And what besides? Therefore what has the one share really cost me altogether? Price + brokerage. Therefore in buying I must add the brokerage to the price. (Give familiar examples.) Now, in the case of selling. If he sells a share for me, what does he receive for it? But will he give me the whole price? Therefore the money I receive will be price - brokerage. Therefore in cases of selling, the price received is price - brokerage. (Write sums on black-board.)

III. Recapitulate by questions on broker, brokerage, and when I must add and when I must subtract. Ask examples again.

IV. Here give problems bringing in the two cases. Make the class work out each step, and give reasons for their answers, and finally mark some sums in exercise books.

THE EXTRACTION OF SQUARE ROOT.

Class—Age, 15 to 17. *Time*—Three-quarters of an hour. *Previous Knowledge*—Involution and elementary mathematics. *Aim*—To exercise the reason and judgment in the explanation of the process of evolution.

MATTER.

I. Preparation.

1. Terms.	(a) Involution.	{ Square. Power.
	(b) Evolution.	{ Root and meaning of $\sqrt{}$. Surd.

BLACKBOARD ILLUSTRATION.

$$\begin{array}{lll}
 10 \times 10 = 10^2 & 6 \times 6 = 6^2 & 8 \times 8 = 8^2 \\
 = 100 & = 36 & = 64 \\
 \sqrt{100} = & \sqrt{36} = 6 & \sqrt{64} = 8
 \end{array}$$

Perfect square = 256, because $\sqrt{256} = 16$.

Surd = 18, because $\sqrt{18}$ cannot be obtained.

II. Presentation.

1. Principle.	(a) $(10 + 6)^2 = 10^2 + 120 + 36 = 256$.
	(b) If a number consists of two parts, the second power of the number consists of the second power of the first part, together with second power of second part and twice product of second and first parts.
	(c) Algebraical formula— $(a + b)^2 = a^2 + 2ab + b^2$.

2. Rule.
- | | |
|---|---|
| { | (a) Point off every second figure beginning with units. |
| | (b) Find nearest square of first number. |
| | (c) Take this square from whole number. |
| | (d) The remainder must contain |
- | | |
|---|---|
| { | (i.) Square of second number. |
| | (ii.) Twice the product of the two numbers. |

(i.) $\sqrt{256(10 + 6)}$
 $\frac{100 = 10^2}{20)156(6}$
 $\frac{120 = 2 \times 10 \times 6}{36 = 6^2}$

Work in a similar way.

$$\sqrt{144}$$

$$\sqrt{625}$$

(ii.) $\sqrt{256(16)}$
 $\frac{100}{26)156(6}$
 156

$$\sqrt{289}$$

$$\sqrt{724}$$

Rule stated.

1. Point off alternate numbers from unit and divide number into periods.
2. Find nearest square root of first period and subtract its square.
3. Set down remainder and bring down next period.
4. Double the first figure, set it down and use it as a trial divisor for the first two figures.
5. Place the quotient thus found to its right and then divide as usual.

III. Association.

1. Compare process of evolution with the algebraic method $\sqrt{a^2 + 2ab + b^2}$.

2. $\sqrt{a^2 + 2ab + b^2(a + b)}$
 $\frac{a^2}{2a + b \mid + 2ab + b^2}$
 $\frac{+ 2ab + b^2}{+ 2ab + b^2}$

3. $\sqrt{324(18)}$
 $\frac{1}{28)224}$
 224

IV. Recapitulation.

- Of {
 1. Terms.
 2. Principle.
 3. Rule stated.

V. Application.

1. Easy Problems. {
 (a) What is the length of the side of a square field whose area is 5 acres 2 roods 20 poles?
 i. Reduce to poles: 5 ac. 2 rd. 20 pl.

$$\begin{array}{r} 4 \\ 22 \\ 40 \\ \hline 900 \text{ pls.} \end{array}$$

 ii. Extract sq. root: $\sqrt{900(30 \text{ pls.})}$

$$\begin{array}{r} 9 \\ \hline 00 \end{array}$$

 { 5 ac. 2 rd. 20 pls.
 Length of side, 30 pls. } *Ans.*

Test Paper at the end of a Week.

1. What do you mean by involution, evolution, root square? What is the square of 9, 27, 52, and the square root of 36, 144, 256?

(To examine elementary principles.)

2. Give the algebraical square of $(a + b)$. Find the square of $8 + 10$ and $40 + 5$ by the same method. Find the square root of 625, explaining your working.

(To examine application of principle.)

3. Work out the following: $\sqrt{649636}$, $\sqrt{5774409}$, $\sqrt{5764801}$.

(To test accuracy.)

4. Give the rule for pointing off when the square contains some decimal places. Work out the following: $\sqrt{.000289}$, $\sqrt{3831.61}$, $\sqrt{42.25}$.

(To test knowledge of decimal point.)

5. (a) A room is 45 ft. long and 60 ft. wide and 10 ft. high, what is the distance between a lower corner and the opposite upper corner?

(b) What is the distance between the tops of two towers 12 yds. apart, and which are 92 ft. and 140 ft. high respectively?

(To test knowledge of connection with Pythagoras' theorem.)

PROCEDURE.

I. Introduce lesson by referring to decimals where the denominator is a power of ten. What is the meaning of power? What is the second power called? What is the difference between long measure and square measure? Why called square measure? The process of finding the power of a number or its square is called what? We shall learn the opposite process, and find the number which, when multiplied by itself, forms a square. This is called the *root*, and the sign to represent the word is $\sqrt{}$, which is supposed to be a corruption of the letter *r*. This process is called *Evolution*. (Write on blackboard, and give examples of square, power, root, with easy numbers.) Let class find out that root cannot be expressed of every number. Give term *Surd*, and write on blackboard.

II. Refer to algebraic method of square ($a + b$). Supply numbers and see what the result is. Ask class to find square of different numbers by dividing them into two parts and following this principle.

Ask the principle from the class. (Write on blackboard.)

Ask for algebraical formula. Try with several easy examples.

Take the example already used, $16 \times 16 = 256$.

State the rule about pointing off numbers and follow the rule according to matter. What is the first number in this case?—200. Nearest root of 200?—10. What is 10^2 ? = 100. Take this 100 away from 256 and what remains?—156. According to the principle stated above, what have we done so far? What is still to be found? Square of other number and

twice the product of both numbers. This, then, must be contained in 156. We know one number is 10 and $2 \times 10 = 20$, \therefore 20 must be contained in 156 a certain number of times, + the square of that number. Try 6, $6 \times 20 = 120$, and $156 - 120 = 36$, which is square of 6, \therefore 6 is the second number. The whole root comes to $10 + 6 = 16$. Then go through same sum in shorter method (2) and deduce the rule. What did we do first? What does the first period really stand for—tens or units? Why is it subtracted from the whole number? Why is the first figure doubled? Why used as a trial divisor only? What else must be contained in the remainder?

Repeat the operation with several numbers, as 144, 625, 289 and 724, asking the method of involution of each number before beginning the opposite process.

III. Compare method with algebra. Make class work out sums in algebra, then compare method and find out slight difference. No pointing off. Why? Form of answer in two terms, in numbers in one whole number. Why? Go over sums already worked and analyse working by questions. How do we get this quotient? What does the 1 stand for? Why do we subtract? How do we obtain 28? Why do we double first quotient? etc.

What do you mean by power? Square? Root? Surd? Involution? Evolution? What does the product of the sum of two numbers contain? What is the algebraical formula for this? State the rule for the extraction of square root? Name the points in it. Give reasons for each.

IV. Write problem on blackboard, and ask why it refers to square root. Question on square measure and long measure. Why must we reduce to poles? If the area had been acres only, should we still reduce? Why? Why does the square root give the *length* of a side? (Use the same problem and ask the distance round the field.) Why multiply by 4? Give a few problems on the model of this one for class-work. (In second lesson other cases involving square root may be introduced.)

NOTES OF A FIRST LESSON ON SYMBOLIC EXPRESSIONS.

Class—Average age, 12. *Time*—Forty minutes. *Aim*—To exercise the reasoning powers of the pupils and lead them to a knowledge of how to represent problems symbolically.

MATTER.

I. Preparation.

1. Meaning of.
2. Why difficult to beginners.
3. How to overcome the difficulty.

II. Presentation.

1. *First Examples.*
 - (a) By how much does x exceed 17?
 - (b) By how much does 17 exceed x ?
 - i. Suppose $x = 20$, then it exceeds 17 by $(20 - 17)$, i.e., 3. Therefore x exceeds 17 by $(x - 17)$. Deduce 2 in same way.

- Other Examples done by Class.*
1. What must be added to x to make y ?
 2. What is the excess of 90 over x ?
 3. If 100 be the sum of two numbers, and c be one, what is the other?
 4. What is defect of $2c$ from $3d$.

2. *Second Examples.*
 - (a) If a be one factor of 20, what is the other?
 - (b) How far can a man walk in a hours at the rate of 4 miles an hour?

- i. Suppose $a = 5$, then $\frac{20}{5} = 4$ the other factor; therefore $\frac{20}{x} =$ the required factor.

- ii. In 1 hour he goes 4 miles, therefore in a hours a times as much, i.e., $4a$ miles.

- Exercise in like ones.*
1. How far can I walk in x hours at rate of y miles an hour?
 2. A train goes x miles an hour; how long will it take to go 120 miles?
 3. If 100 contains x 5 times, what is the value of x ?

3. Third Class of Examples involving reduction. $\left\{ \begin{array}{l} (a) \text{ What is the velocity in feet per second of a train going 30 miles in } x \text{ hours?} \\ (b) \text{ If I spend } x \text{ shillings out of } \pounds 20, \text{ how many shillings will be left?} \end{array} \right.$

i. $\frac{30}{x}$ = rate of miles per hour.

$\frac{30}{x \times 60 \times 60}$ = rate of miles per second.

$\frac{30 \times 1760 \times 5280}{x \times 60 \times 60} = \text{No. of feet per sec.} = \frac{44}{x} \text{ feet per sec.}$

ii. $\pounds 20 \times 20$ = number of shillings.

$400 - x$ = number of shillings left.

- Other Examples of same. $\left\{ \begin{array}{l} 1. \text{ A man has } a \text{ crowns and } b \text{ florins, how many shillings?} \\ 2. \text{ If I give away } c \text{ shillings out of a purse with a sovereign, and } b \text{ florins in it, how many shillings are left?} \end{array} \right.$

III. Association.

Explanation by the help of concrete numerical examples.

IV. Application.

Further exercise on the same kinds of problems.

PROCEDURE.

I. Write name on blackboard. Ask meaning of term symbol in general and in algebra, also examples of each. What do we mean by "expressing ourselves in figurative or symbolic language"? and again by expressing a sum in symbolic form? Why are symbols so difficult to beginners? The best way to get accustomed to these abstract expressions at first is to suppose some number in each case and examine how we treat it.

II. 1. Write first example on blackboard. If we cannot tell answer without knowing value of x , suppose $x = 20$. What then? How did we arrive at the answer 3? $20 - 17 = 3$ ($x - 17$) Ans. Work second example in same way.

Then let class express the other examples without the intermediate steps.

2. *Second Examples.* Treat these in the same way, supplying numbers for symbols first, then leading class to obtain the desired expression. Then give the other examples.

3. *Third Examples.* If it goes 30 miles in say 10 hours, how many in one hour? $\frac{30}{10} = 3$ miles. But when x is number of hours, what is the velocity? $\frac{30}{x}$ miles per hour.

Next, how shall we find the number of miles per second? Bring x hours to seconds. Lastly, if it goes $\frac{30}{x}$ miles, how many feet will it go per second? Will it be more or less? What is the multiplier? (1760×3 .)

III. Work other examples in the same way.

IV. The class will by this time be prepared to work easy examples by themselves; let them continue the exercise out of their text-books for home-work.

NOTES OF A FIRST LESSON ON FACTORS (ALGEBRA).

Class—Oxford Junior Grade. *Time*—Forty minutes. *Previous Knowledge*—To find mentally the square of a binomial, the product of its sum and difference, and the product of any two binomials. *Aim*—To exercise the reasoning powers of class in leading them to deduce for themselves the solution of factors.

MATTER.

I. Preparation.

1. Meaning of terms *Factors* and *Resolution*.
2. Oral exercises in forming products of *Binomials*.
 - (1) $(a + b)^2$.
 - (2) $(a - b)^2$.
 - (3) $(a + 2)(a + 3)$.
 - (4) $(a - 2)(a - 3)$.

Call special attention to the signs and how each is obtained.

II. Presentation.

1. Analyse the square of a binomial.

The sq. of first + sq. of second + or - twice product of both.

$$\left. \begin{aligned} \text{E.g., } (a + b)^2 &= a^2 + b^2 + 2ab \\ (a - b)^2 &= a^2 + b^2 - 2ab \end{aligned} \right\} \text{Note why signs differ.}$$

Therefore being given the second part of example, the first can be deduced.

$$\begin{aligned} \text{Other Examples to } & \begin{cases} x^2 + y^2 + 2xy. \\ m^2 - 2mn + n^2. \end{cases} \\ \text{Factorise.} & \begin{cases} a^2 + 4a + 4. \\ a^2 - 6a + 9. \end{cases} \end{aligned}$$

2. Draw attention to formation of product of two binomials.

$$\text{E.g., } (x + 3)(x + 5) = x^2 + 8x + 15 \quad \left(\begin{array}{c} x+3 \\ \times \\ x+5 \end{array} \right)$$

$$(x - 3)(x - 5) = x^2 - 8x + 15 \quad \left(\begin{array}{c} x-3 \\ \times \\ x-5 \end{array} \right)$$

$$\begin{aligned} \text{Points to be noticed.} & \left\{ \begin{array}{l} \text{First term } x^2 = \text{product of } x \text{ and } x. \\ \text{Third term } + 15 = (+3)(+5) \text{ or } (-3)(-5). \\ \text{Middle or second term} = \text{cross multiplication and addition.} \end{array} \right. \end{aligned}$$

$$\{(+x)(+3)\} + \{(+x)(+5)\} \text{ in first example.}$$

$$\{(+x)(-3)\} + \{(+x)(-5)\} \text{ in second example.}$$

Conclusions drawn—

$$\text{As to Signs.} \quad \left\{ \begin{array}{l} \text{Last sign } + \text{ shows both are alike.} \\ \text{First sign } + \text{ shows both are } + \\ \text{First sign } - \text{ shows both are } - \end{array} \right.$$

$$\text{As to Numbers.} \quad \left\{ \begin{array}{l} \text{Last term shows product of two numbers.} \\ \text{Second term shows sum of two numbers as coefficient of first term.} \end{array} \right.$$

Analysis of some examples.

$$1. \quad x^2 + 11x + 24 = (x + 8)(x + 3).$$

(Find factors such that product = +24 and sum = +11.

$$2. \quad x^2 - 7x + 12 = (x - 4)(x - 3).$$

$$3. a^2 + 5ab + 6b^2 = (a + 2b)(a + 3b).$$

(Product = $+6b^2$, e.g., $2b \times 3b$; sum = $5b$.)

$$4. a^2 - 38a + 361 = (a - 19)(a - 19) \text{ or } (a - 19)^2.$$

(Product = 361 ; sum = $-38a$.)

III. Association.

1. Connect the building up of a product in each case with the factors, and also the rule of signs for multiplication.

2. In connection with the square of $(a - b)$ contrast $a^2 - b^2$ and teach its factors.

IV. Recapitulation

Of factors of:

$$a^2 + 2ab + b^2.$$

$$a^2 - 2ab + b^2.$$

$$a^2 - b^2.$$

V. Application.

Work examples out of text-book.

PROCEDURE.

I. Begin by asking the meaning of "*Factors*". Why they are so called: from Latin *facere*, to make. How they are combined to form another expression. What this expression is called—product. Being given this expression, what is the process of breaking it up into factors called?—resolution. The one process is merely the converse of the other. Therefore to do the latter we must have a knowledge of the former, so we shall have a little exercise in it first.

II. What is the square of $(a + b)$? etc., etc. (As in matter). How obtained. Show

$$\begin{array}{r} (a+b) \\ \times \\ (a+b) \\ \hline a^2 + 2ab + b^2 \\ \\ (a-b) \\ \times \\ (a-b) \\ \hline a^2 - 2ab + b^2 \end{array}$$

(a) Process of cross multiplication. Square of $(a - b)$. Work in same way. Ask the result in each case. What is the only difference? Next take square of $(a + 3)$ and of $(a - 3)$ and compare the results in a similar way. Deduce general rule; square of first + square of second + or - twice product of first and second. Now consider the converse. Being given the square, how find the root? What is the root of a^2 and b^2 ? What signs connect them? Give other examples of the same, and question pupils in each case as to how each of the terms in the example was formed. Call attention to the sign before the second square. Why is it always +? Why and how does the middle sign vary?

(b) Now let us consider the case where the binomials differ in number but not in signs, *e.g.*, $(x + 3)$, $(x + 5)$. What is the product of the first terms?

$$\begin{array}{r} x+3 \\ \times \\ x+5 \\ \hline x^2+8x+15 \end{array}$$

Of the last terms? How do we obtain the middle term? On what does the last sign depend? On what the first? Change sign in factors, and what results? Work another example in same way.

$$\begin{array}{r} a+4 \\ \times \\ a+3 \\ \hline a^2+7a+12 \end{array}$$

Work backwards to find factors. What are the only factors of 6? What are the factors of 12? (6×2) , (4×3) , (12×1) . How decide which of these to take. By middle term. How is it obtained? Therefore 7 represents the sum of two numbers. Analyse a few examples as in matter, questioning as to the reason in each case, and then exercise class in quickness by several expressions to be resolved orally without aid.

(c) Lastly, let class find product of $(a - b)(a + b)$ by cross multiplication, and contrast it with square of $(a - b)$ as to signs and terms, noticing why middle term is = 0. Ask what are the factors then when we

$$\begin{array}{r} a+b \\ \times \\ a-b \\ \hline a^2-b \end{array}$$

are given the difference of two squares (the sum of two terms \times their difference). Give a few examples of forming their product and resolving it when formed, and then some examples for class to work the latter step without previous one.

IV. Recapitulate the cases treated of in lesson, placing one simple example of each on blackboard, by which the whole may be recalled.

Mark exercise in text-book to be done for home-work.

LESSON ON QUADRATIC EQUATIONS.

Class—Oxford Junior. *Time*—Forty minutes. *Aim*—To exercise judgment and reason of the class in the solution of a quadratic equation.

MATTER.

I. Preparation.

1. Definitions.

(i.) Simple Equation.	$3x + 1 = 7.$
	(a) One unknown quantity. (b) Method of solution.
(ii.) Quadratic Equation.	(a) Contains square of unknown. $5x^2 = 20.$ <i>Pure quadratic.</i>
	(b) Contains square and first power of unknown. $2x^2 - 5x = 3.$ <i>Adfected quadratic.</i>

II. Presentation.

1. Analysis of the Square of a Binomial.

$$(x + 3)^2 = x^2 + 6x + 9.$$

(a) First term $= x \times x.$ Third term $= 3 \times 3.$

Middle term $= 2 \times 3 \times x.$

(b) Connection between last term and middle.

2. Solution of

(a) Pure quadratic.

(b) Adfected quadratic.

(a) *Pure Quadratic.*

$$\frac{9}{x^2 - 27} = \frac{25}{x^2 - 11} \text{ clear of fractions.}$$

$$\text{Therefore } 9x^2 - 99 = 25x^2 - 675$$

$$\text{Therefore } 16x^2 = 576$$

$$x^2 = 36$$

$$x = \pm 6.$$

(b) *Adfected Quadratic.*

$$x^2 - 6x = 16$$

$$x^2 - 6x + \left(\frac{6}{2}\right)^2 = 16 + 9$$

$$(x - 3)^2 = 25$$

$$x - 3 = \sqrt{25}$$

$$= \pm 5$$

$$\text{Therefore } x = 8 \text{ or } -2.$$

III. Association.

Questions in procedure.

IV. Recapitulation.

Analysis of above solution.

V. Application.

Solve $x^2 + 8x = 30$, and several similar examples.

PROCEDURE.

I. Question the class as to the meaning of Simple Equation. Write example on blackboard. What is to be found out in this example? How do we proceed in the solution? Why do we change signs in changing sides? etc.

(i.) What do you notice as different in this equation? Can we solve it as a simple equation? Why not? (This is called a quadratic because x is squared, but it is a *pure quadratic*.) How did we solve it?

(ii.) What do you notice about this equation? Can I say it is pure? Why not? Is it a quadratic? Why? (This is called an *adfected quadratic* because the square of x and first power are involved.)

II. Make the class square the binomial $(x + 3)$. Write it on blackboard. Of what is our first term composed? Last term? Middle term? What connection is there between

the last term and the middle term? (Give other examples to bring out the connection.)

Pure Quadratic: State it and ask the class which kind it is. And why. Let them solve it. What sort of equation is this? What may I do to an equation without altering it as an equation? (Here go back to square of binomial and refer to the three terms.) What is wanting on the left side of the equation to make it a square? What connection have we found between two and three terms of a square? Can I supply anything to make this a perfect square? If I add to one side, what about the other? What will be the factors of the left side? Of right? What sort of an equation have I now? $x - 3 = 5$. How can I find value of x now? Can I find any other value of x ? If so, why?

III. *Association*: By reference to known facts in procedure.

IV. *Recapitulation*: What have I added to each side of the equation? Why does this make it a perfect square? What did I do to the opposite side? Why? How do I get result $x - 3$? How many roots do I get?

V. Give equation to be solved by pupils—first on black-board, and then one or two to be done by pupils themselves unaided.

LESSON ON THE EXTRACTION OF SQUARE ROOT (COMPOUND ALGEBRAIC EXPRESSION).

Class—Age, 15 to 17 years. *Time*—Forty minutes. *Aim*—To exercise reasoning powers of the class and lead them to knowledge of how to extract square root in algebra.

MATTER.

1. Preparation.

1. Meaning of terms *root* and *square*.

$$2. \text{ Oral exercises in simple expressions } \left\{ \begin{array}{l} \sqrt{16a^4b^2c^6} \\ \sqrt{9x^6y^2} \\ \sqrt{\frac{36}{a^{36}}} \end{array} \right.$$

$$3. (a + b)^2 = a^2 + 2ab + b^2.$$

II. Presentation.

To find method of extracting the square root of a compound expression, analyse 3 as follows :—

We know the square of $(a + b)$ is square of a + square of b + twice product ab .

From $a^2 + 2ab + b^2$ take away the square of first part of root.

$\begin{array}{r} a^2 \\ \hline + 2ab + b^2 \end{array}$ or $b(2a + b)$. This remainder contains the square of second root + twice the product. To obtain the quotient b as the second term of root, we must divide the remainder by $(2a + b)$, which consists of two terms :—

1. The double of first term (which when multiplied by b) makes twice the product.

2. Second term b (which when multiplied by b) makes the square of second term of root.

Rearrange above thus :—

$$\begin{array}{r|l} a & a^2 + 2ab + b^2 \\ \hline & a^2 \\ \hline 2a + b & + 2ab + b^2 \\ & + 2ab + b^2 \end{array} \quad \begin{array}{l} a + b \\ \hline \end{array}$$

Go over the same with :—

$$\begin{array}{r|l} 3a & 9a^2 + 12ab + 4b^2 \\ \hline & 9a^2 \\ \hline 6a + 2b & + 12ab + 4b^2 \\ & + 12ab + 4b^2 \end{array} \quad \begin{array}{l} 3a = \text{root of 1st term} + 2b \text{ 2nd term.} \\ \hline \end{array}$$

(Contains $2 \times$ product + square of second term.) Therefore divide $2 \times 3a$ to find second term. $2b$ is thus found, add it to divisor and proceed with division.

Deduce from the above the following rule and extend it to multinomial expressions :—

1. Subtract square of first term, set root in quotient.
2. Bring down next two terms.
3. Use double root already found as trial divisor for second part of root.
4. Add second root to this divisor; place root thus found in quotient and proceed as in ordinary division.

Further Application :—

5. If there are more terms bring down next two.

6. Double root already found for trial divisor and proceed as above.

III. Application.

Find square root of:—

$$\begin{array}{r|l}
 4x^2 & 16x^4 - 24x^3a + 25x^2a^2 - 12xa^3 + 4a^4 \quad \underline{4x^2 - 3xa + 2a^2} \\
 & 16x^4 \\
 \hline
 8x^2 - 3xa & - 24x^3a + 25x^2a^2 \\
 & - 24x^3a + 9x^2a^2 \\
 \hline
 8x^2 - 6xa + 2a^2 & + 16x^2a^2 - 12xa^3 + 4a^4 \\
 & + 16x^2a^2 - 12xa^3 + 4a^4
 \end{array}$$

IV. Recapitulation.

Of rule.

Of reasons for it.

PROCEDURE.

I. What is meant by squaring a number, *e.g.*, 4? What is a root? What is meant by $\sqrt{16}$? How is it represented simply? Give oral exercises in finding root of simple expressions, *e.g.*, $\sqrt{9a^2} = 3a$; $\sqrt{81b^6c^4} = 9b^3c^2$. Deduce rule from these.

II. Now we shall consider how to find the root of a compound expression. What is $(a+b)^2$? Analyse it with class. The square of first + square of second + twice product. From the square of the whole take the square of a . What remains? What is it equal to? Factorise remainder. $b(2a+b)$. By what must we divide $(2ab+b^2)$ to get quotient b ? $(2a+b)$. Examine the divisor (twice the first quotient + second quotient). Work out this division and compare results with starting point. Question on steps in above, to call attention of class to points noticed in matter. Then impress the same by working another example. $\sqrt{9a^2 + 12ab + 4b^2}$. This is the square of a binominal expression. What is first term the square of? (Put it in quotient and subtract.) What does the remainder contain?

Compare with first example to find next divisor. (Twice the root already found as trial divisor + second part of root.) Continue working with this divisor. What is the quotient? What is the whole root?

Next question in the different steps and the reason for each, and deduce from them the rule as in matter.

III. We shall now further apply these steps to obtain the root of a multinomial. Write sum on blackboard and work it as before, continuing the process by doubling the root already obtained in each step, as trial divisor, and adding the final quotient to this divisor before proceeding to multiply and subtract.

IV. Recapitulate by another example. Conclude lesson by giving a simple example to be worked out by each pupil unassisted.

OBJECT-LESSON ON A SPIDER.

Class—Age, 9 to 11 years. *Time*—Half an hour. *Aim*—To interest pupils in Natural History.

MATTER.

I. Preparation.

Show picture of spider and its web. Ask class when and where they have seen such. Meaning of name, “a spinner”.

II. Presentation.

Let pupils describe from observation as far as possible.

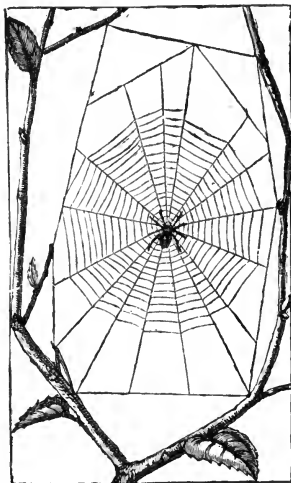
1. *Structure of*—

(a) *Head and chest* in one. Head provided with two claws or mandibles containing poison, in sheaths when not used.

(b) *Eyes*: Eight. Two on top, two on each side, and two in front. Why necessary? Immovable.

(c) *Legs*: Eight. Can grow again if lost. One or more of feet has a comb-like arrangement for twisting and carding the silk tissues.

(d) *Spinning Machine* : In a depression under the hinder part of the body are four small tube-shaped bodies, with a



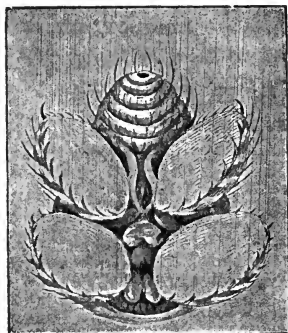
THE SPIDER'S WEB.

1. Radiating lines.
2. Spiral lines.
3. Foundation lines.

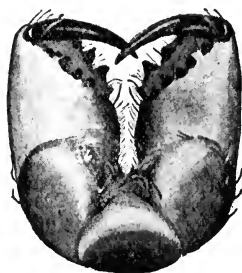


CLAW OF GARDEN SPIDER.

great number of extremely fine openings or pores (1,000 on each). Through each the spider draws a fine thread, twists



SPINNERETS (much enlarged).

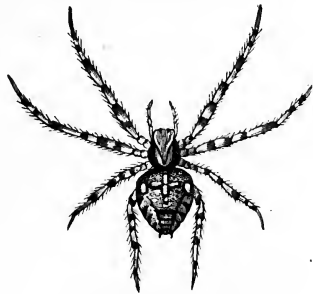


SPINNERETS OF THE GARDEN SPIDER.

4,000 together to make *one* thread of web (1,000 of such one hair).

2. *Habits*.—Do not undergo metamorphoses like insects. Live on insects. Ferocious by nature. How they make their webs. Repeatedly change their coats. Why? Lay eggs in a cocoon before they die.

3. *Kinds*. { (a) Geometrical spider.
(b) Water spider.
(c) Building spider.



A LARGE SPIDER.

PROCEDURE.

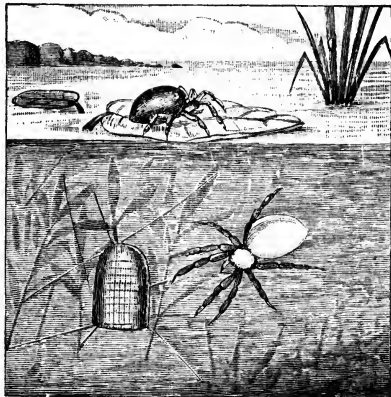
III. Association.

1. Contrast structure with butterfly and other insects. *Eight* not *six* legs; no wings or antennæ; no metamorphoses; eight single eyes, not compound like flies.

2. Connect structure with habits; adaptability for obtaining its food; catches fly with web; clutches it with mandibles; poisons it with a prick from them; and bites it with its long jaws.

3. Proof of its cleverness. Formation of its perfect web in about 40 minutes. Careful and prompt examination and repair of it daily. The wonderful structure of the spring door to the "mason spider's" house.

4. The formation of the feet adapted to walk on water, ceilings, glass, etc.



THE WATER SPIDER.

IV. Application.

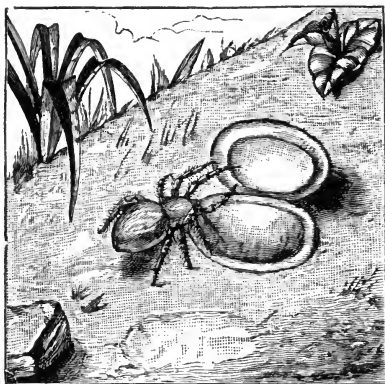
Uses of: (1) To catch flies and other insects. (2) Produce a material from which silk is manufactured. *Difficulties:* (1) their ferocious nature hinders their being reared together in numbers. (2) 12 spiders = 1 silk-



PART OF FOOT AND CLAWS
MAGNIFIED.

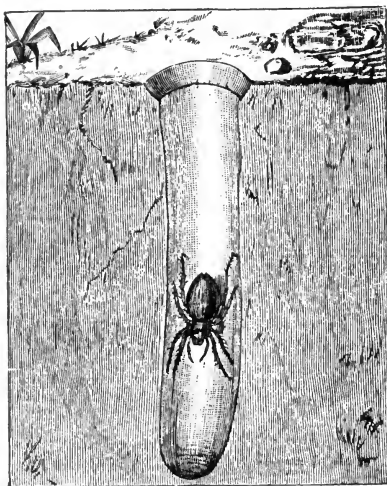
worm — 27,000 to make 1 lb. of silk.

(3) Difficult to feed such a number. Used in medicine, *i.e.*, web, rolled as a pill, for ague and fever.



THE TRAP-DOOR SPIDER.

V. *Recapitulation:* By questioning on chief parts of lesson.



HOME OF TRAP-DOOR SPIDER.

OBJECT-LESSON ON THE HORSE.

Class—Form I.; age, 9 to 11 years. *Time*—Half an hour. *Aim*—To exercise the power of observation of pupils.

MATTER.

I. Preparation.

Show a picture of a horse and ask when and where class have seen such animals.

II. Presentation.

1. *Description.* { Largest domestic English animal; thick skin.
Different colours — black, white, grey, bay, dun, dappled.

2. *Structure.* { To be elicited from class.



Body : Long, muscular, strong shoulders, curved back.

Head : Long, rather pointed towards the muzzle.

Neck : Long and graceful, flowing mane.

Ears : Short, pointed, movable (separately).

Eyes : Large, bright, see both sides and in front.

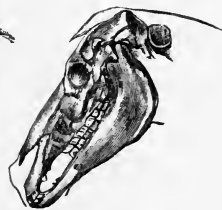
Nostrils : Large, breathes through, keen to smell.

Lips : Large and strong.

Teeth : (Place for the bit).



A HORSE'S MOUTH.



A HORSE'S MOUTH.

Legs : Long and thin.

Hoofs : One piece. Toe covered by a horny case.

Tail : Long flowing hair.

Skin : Thick, sleek, soft, covered with soft hair.

PROCEDURE.

III. Association

Let class mention other domestic animals, and contrast their uses. Note oxen as beasts of burden; also dogs.



A HORSE'S HOOF (Unshod).



A HORSE'S HOOF (Shod).

Connect the different parts of the horse with its suitability for use, and compare with other animals.

Body : Curved back, hence carries weights; strong shoulders, etc.

Ears : Movable, hence quick to hear. Contrast human beings.

Eyes : Shies easily, blinkers necessary.

Lips : Used to pick up food and gather grass.

Legs : Runs quickly; fights by kicking with hind legs.

Hoofs : Cf. nails. Contrast cloven-footed animals—two toes.

Kinds of Horses.	$\left\{ \begin{array}{l} \text{Racers.} \\ \text{Carriage Horses.} \\ \text{Dray Horses.} \end{array} \right\}$	Parts adapted for each.
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IV. Application.

Alive. Chief beast of burden in temperate climates.

<i>Uses dead</i> .	{	<i>Skin</i> : Leather.
		<i>Hair</i> : Cloths and stuff cushions.
		<i>Hoof</i> : Glue.
		<i>Bones</i> : Handles of knives, etc.

V. Recapitulation.

Question on matter.

OBJECT-LESSON ON THE BUTTERFLY.

Class—Average age, 11 years. *Time*—Half an hour. *Illustrations*.—Specimens of three stages of a butterfly. *Aim*—To train the pupils' power of observation by leading them to examine the butterfly, and take an interest in Nature.

MATTER.

I. Preparation.

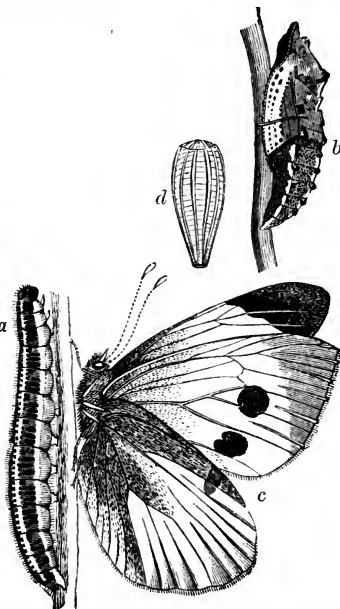
Life History of a Butterfly.

General Remarks : { 1. As a grub ; living on leaves ; eating much. (Transition stage as a chrysalis.)
Two Lives. { 2. A beautiful winged insect flying from flower to flower.

II. Presentation.

1. *Life as a Caterpillar.*

(a) *Description.* { *Body* : Long, soft and ringed ; worm, snake, etc.
Head : Small, black, shiny, strong jaws. Why ?
Eyes : Very small, at top of head.
Feet : Three pairs, long and pointed, behind the head. (Correspond to legs of butterfly.) Four pair stumpy ones and two more at tail, used for grasping.
Hairs : Tufts all along back (use).
Breathing holes behind each ring (no lungs).
 (b) *Habits* : Food, eats fresh leaves greedily (pest of gardens).



THE FOUR STAGES OF THE LARGE WHITE BUTTERFLY.

a, larva ; *b*, pupa ; *c*, imago ; *d*, egg.

(c) *Change of Skin*: Cf. moulting of birds, reason for, manner of.

2. *Transition Stage: Chrysalis.*

When full size is reached, new eyes, legs and wings and mouth begin to form under the skin. After the next cast of old skin a chrysalis emerges. Contrast it with caterpillar as to *skin, food, movement.*

Really a hard shell covering the new and delicate young organs of the butterfly. Hangs head down from a leaf or spins a web around itself.

Parts of butterfly inside the chrysalis. How skin is hardened (gum). After a few days or weeks the butterfly bursts through its prison walls.

3. *Description of Butterfly.*

- (a) Four large beautifully coloured wings.
- (b) Six long legs.
- (c) Eyes large and projecting. Why?
- (d) Two long antennæ or feelers (use).
- (e) Sucking trunk (suited for flowers).
- (f) Body smaller and lighter.

III. Association.

Contrasts and comparisons with other forms of life as shown throughout method.

IV. Recapitulation

Of the characteristics of the butterfly in all its stages.

V. Application.

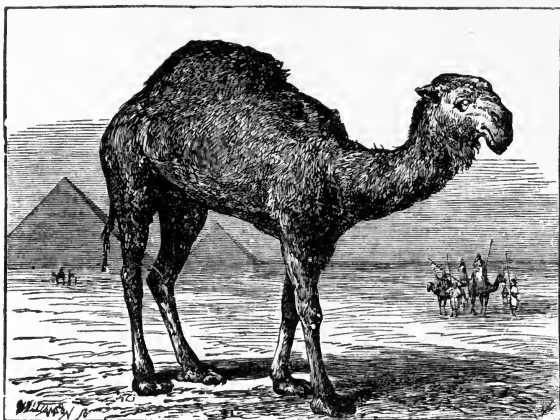
Point out how carefully nature provides everything necessary and suitable for the least of its creatures.

PROCEDURE.

I. Begin lesson by showing blackboard illustrations of a butterfly in all its stages, and asking class what they see, and where they would find each. Ask how many kinds of life has a butterfly. Compare with the frog in number, but contrast kinds.

II. Draw pupils' attention to the caterpillar, and ask all they notice about its *body*. What other creatures it resembles? How it differs from the snake? How different caterpillars differ in appearance, *e.g.*, woolly bear? What colour generally, and why Providence so arranges it? What kind of head? Why such strong jaws? How many feet? Do you notice any difference in them? Contrast with the butterfly as to number and position, and lead class to see that the four back pairs are necessary to support the long body, but unnecessary to the butterfly. Call attention to hind ones at tail, and show they grasp. Point to the hairs and ask their use, and if all are provided with them. Ask how it breathes. Show breathing holes. Contrast with higher animals and with fishes. What does it live on? Contrast with butterfly as to quality and quantity of its food. Refer to the frog. Ask what happens to it every six months or so, and what provision is made for its increasing in size? Do pupils know of any reptile that casts its skin also? Do they think the caterpillar does, and why? After doing so several times a change comes over it. Describe the transition stage. Let class contrast the chrysalis with the caterpillar as to appearance, food, movement. Show enlarged diagram and elicit from class, by pointing to the markings, that it is really more of a butterfly than caterpillar. Ask what is going on during the chrysalis stage. How the butterfly escapes from its prison? Let class describe it from diagram, and question as to the use of each part, and contrast with first stage. What are its habits now? Draw from class some more striking varieties. Now draw distinction between the butterfly and the moth. One loves the light, the other the dark. Tell them that they lay eggs before they die. Ask where likely to do so. Call attention to Providence's guiding here again, since they lay them near or on leaves suited to the grub and not the butterfly. Show from this one of the reasons for the latter having wings.

III. Recapitulate the matter, and ask class in conclusion what little lesson about God we have learnt from examining the life of a butterfly.



THE CAMEL.

OBJECT-LESSON ON THE CAMEL.

Class, Preparatory—Age, 9 to 11 years. *Time*—Half an hour. *Aim*—To exercise the powers of observation of pupils.

MATTER.

I. Preparation.

Draw from class what they already know about the camel.

II. Presentation.

Show picture and elicit following:—

1. Description.

- Quadruped about six feet high; brown ashy colour, covered with long shaggy hair. One or two humps.
- (a) Long neck.
- (b) Overhanging eyelids.
- (c) Broad feet.
- (d) Cushions on feet, knees and chest.
- (e) Humps (mass of fat), vary in size.
- (f) Internal reservoir.

2. *Habits, Character and Food.*

- (a) Gentle, patient and docile, but stubborn when beaten.
- (b) Lives on herbage and foliage, also dates and barley. It chews the cud.
- (c) Can go for 25 days without water in spring when foliage is full of sap.

PROCEDURE.

III. Association.

1. Reference to its use in Scripture (it is classed among the riches of Abraham, Job, Jacob, etc.; St. John Baptist). Also "camel through the eye of a needle".

2. *Connect structure with use.*

(a) *Long neck*: Can reach tree foliage, also see far across desert and discover trees.

(b) *Eyelids*: Protect eye from scorching rays of sun.

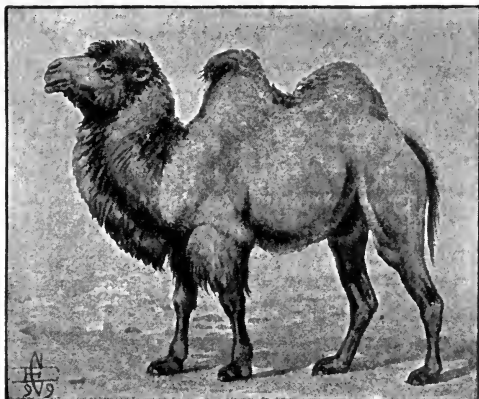
(c) *Feet*: Suited for walking on sand.

(d) *Cushions*: Support weight when eating and in kneeling position.

(e) *Hump*: Substitute for food, varies in size accordingly.

(f) Carries a supply of water to last journey through desert.

3. *Kinds and where found.*



A CAMEL.



A CAMEL'S FOOT.

IV. Application.*Uses.*

1. Beast of burden, "The Ship of the Desert".
2. Milk refreshing and nourishing.
3. Flesh eaten by the Arabs.
4. Water supply used at last resource.
5. Hair, cloth and brushes.

V. Recapitulation.

Contrast the structure and suitability as beast of burden of the camel with those of the horse and the elephant. In what are they alike? In what do they differ?

OBJECT-LESSON ON THE ELEPHANT.

Class—Age, 9 to 11 years. *Time*—Half an hour. *Aim*—To exercise the faculty of imagination by leading pupils to picture an animal which is not familiar to them. To increase knowledge of distant lands.

MATTER.**I. Preparation.**

Relate briefly some story showing the sagacity of an elephant.

II. Presentation.

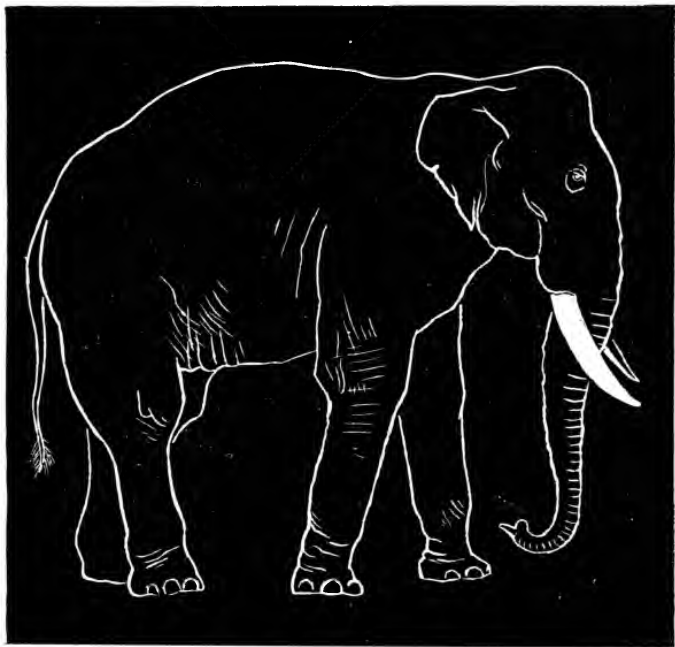
Show picture and let class describe animal. The largest and strongest quadruped. Size, 10 to 15 ft. high.

1. *Structure*: Large head, small eyes, large ears. Few teeth, but two large ivory tusks (about 6 ft. long). These continue to grow with the animal. *Trunk*, or proboscis, long (8 ft.), thick, flexible (moves in any direction); raises weights, small or large. Tip very sensitive, used as fingers; raises food and drink; can kill a man with it; breathes through it. *Legs*: Very short and thick; three or five toes (not separate) covered with horn round feet. *Skin*: Hard, knotty; few hairs; tail short.

2. *Habits*: Sagacious, tractable, gentle and docile. Obeys a look of its guide. Lives in herds. Kneels to be

mounted. Plays with children. Lives 200 years wild, 180 tame. Revengeful of injuries. Bathes in mud.

3. *Food*: Vegetables, herbs, grain, fruit; loves sugarcane, wine and spirits. Eats 100 lb. of food daily.



AN ELEPHANT.

PROCEDURE.

III. Association.

Connect its structure with its habits and uses.

Large Ears: Hearing acute, also protects eyes from insects.

Tusks: Compare and contrast with our teeth as to use, wear, etc.; used in defence, also to force way through forests, etc., hindrance to eating.

Trunk: Adaptability to various uses, sensitiveness of fingers, strength, kangaroo's tail, flexibility, arms, etc., etc.

Skin: No hair, hence worried by flies; remedy, mud baths.



AN ELEPHANT'S FOOT.

Legs: Strength characteristic, suited to body; *cf.* horse; resemble bark of tree in appearance.

Short neck, heavy head to support.

How captured. { 1. Poisoned sugar-canes.
2. Hunted and decoyed by tame ones.
3. Shot with iron or tin bullets (why not lead?)

Tell class a story which will illustrate the above, or which may aid them in locating the elephant in Indian life.

IV. Application.

Uses. { 1. Beast of burden (equal to six horses in strength).
2. African elephant used in war formerly.
3. Flesh—food—dried by Abyssinians.
4. Tusks and teeth—ivory.

Two kinds: (1) Indian (easily tamed); (2) African (larger and wilder).

NOTES OF AN OBJECT-LESSON ON THE BAT.

Class—Average age, 10 years. *Time*—Half an hour. *Aim*—To exercise observing powers of class.

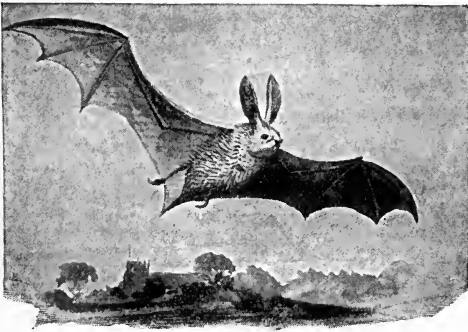
MATTER.

Herbartian Steps.

I. Preparation.

Show picture. Ask what it is, whether bird or beast, or both, or neither.

Like a mouse in general shape and covering ; like a bird because it flies.



A BAT.

II. Presentation.

1. Description.

Head : Large ears, small eyes, folds of skin on nose.

Legs, 4. The forearms long ; 4 fingers and thumb with large nail ; fingers very much lengthened, no nails, joined with skin, and soft, delicate membrane which is also attached to the hind leg and reaches the tail in some. Body covered with yellowish grey fur.

2. Food and Habits.

(a) Food varies. Some live on insects, some live on fruit, others on raw meat. (Vampire sucks blood.)

(b) Dormant during the day, lively at night. Torpid in winter, hangs head downwards covered by its wings.

(c) Shuffles along awkwardly with wings folded back.

(d) Found in roofs of houses, hollow trees, etc.

3. *Uses.* { (a) Destroys insects.
 (b) Food for the Indians (flavour of partridge).

PROCEDURE.

III. Association.

Contrast throughout with a bird to show that it has no essential relations to it. Large ears (bird's not visible), very sensitive.



HEAD OF BAT.

Folds of skin on nose render the smell more acute.

Apparent wings, really a peculiar formation of forearms.

No nails on fingers except on thumb, which is used as a hook to hang from. Contrast the structure of finger-bones

with the bones and feathers of a bird's wing.

Connect the tail with that of a mouse and contrast a bird's tail.



A BAT.

Body covered with fur, not feathers. Its bones have no air cavities, and it does not lay eggs.

Connect fact of its torpidity in winter with the scarcity of insects. Describe how it obtains its food, also how it hangs in day-time, and how it walks.

It is commonly considered a bird of ill-omen because it avoids the light of day.

IV. Application.

Point out how everything has its part and work in creation. The earth would be scarcely habitable because of the pest of insects but for the obscure and ill-famed bat.

V. Recapitulation.

Questions on matter.

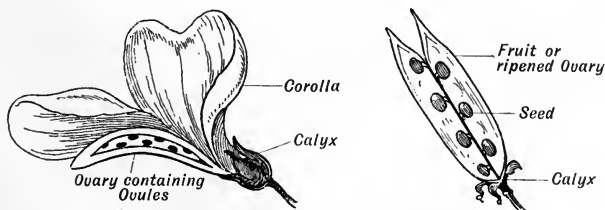
OBJECT-LESSON ON A SEED.

Class—Age, 12 to 14 years. *Time*—Three-quarters of an hour. *Previous Knowledge*—The parts of a flower. *Illustrations*—Specimens of flower and fruit of broad-bean. Some beans, acorns, sycamore seeds and wheat. *Aim*—In teaching the structure of a seed to cultivate the power of observation and an interest in Nature.

MATTER.

I. Preparation.

Show connection between flower and seed.



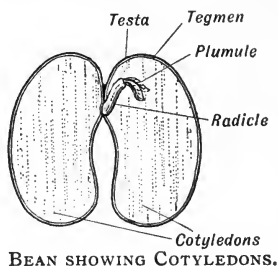
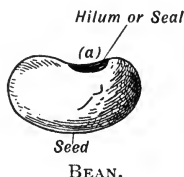
DIFFERENT STAGES OF A BEAN.

II. Presentation.

1. Parts of a seed (as seen in a bean).

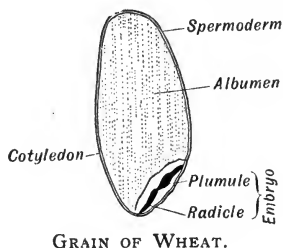
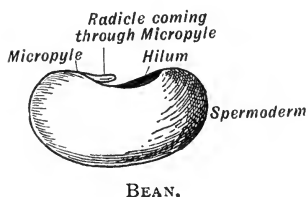
- | | | |
|----------------|---|----------------------------------|
| (a) Spermoderm | { | Testa : outer skin. |
| (or covering). | | Tegmen : inner skin. |
| | | Microphyle : hole in spermoderm. |

- (b) Embryo (or future plant). $\left\{ \begin{array}{l} \text{Radicle : seed-root.} \\ \text{Plumule : seed-stem.} \\ \text{Cotyledons : seed-leaves.} \end{array} \right.$

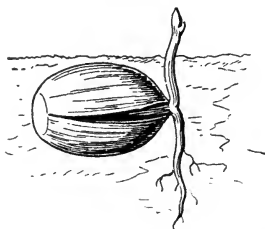


2. Kinds of seeds.

- (a) Monocotyledon, i.e., one cotyledon. $\left\{ \begin{array}{l} \text{Albuminous : having besides the embryo} \\ \text{a food substance called albumen.} \\ \text{Exalbuminous : without albumen.} \end{array} \right.$



- (b) Dicotyledon, i.e., two cotyledons. $\left\{ \begin{array}{l} \text{Thick and fleshy, e.g., bean and acorn.} \\ \text{Thin and leafy, cress, sycamore, etc.} \end{array} \right.$



COTYLEDONS OF ACORN REMAINING UNDERGROUND.

SYCAMORE COTYLEDONS RISE ABOVE CARRYING SPERMODERM.

III. Assimilation.

Give specimens of seeds to examine, *e.g.*, chestnut, oat, almond, maize, etc.; say to what class they belong and describe parts of each.

IV. Recapitulation.

What is the seed? Distinguish between monocotyledonous and dicotyledonous seeds, and mention examples of each. What is the micropyle and what are its uses? What is albumen? Name some seeds containing it.

V. Application.

Thoughts suggested by the study of a seed.	{	<ol style="list-style-type: none"> 1. The minute perfection of God's work. 2. From small beginnings great things spring. 3. Application of St. Matthew's words: "Unless the grain die and sink into the ground itself remaineth alone".
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PROCEDURE.

I. Introduce lesson by questioning class on parts of a flower before them. Call special attention to the ovary. Ask what it contains. What it is called when ripened? Show a pod—open it. Ask what is inside. Seeds. What were they called before ripening? Ovules. Therefore what is a seed? Show a bean. What do they notice at (a)? What caused it? Tell name. *Hilum*.

II. 1. Give each pupil a bean to dissect and examine. Ask what they notice about the exterior. Draw attention to the small hole below the *hilum*; tell its function, and write name on blackboard. Then cut the bean lengthways; separate skin. Ask its use. Give name. *Spermoderm*. Tell class to scrape its inner side with penknife (thus separate the two coats). Show that it is provided with two skins, and write their names as in diagram. We now come to the essential part of the seed, the future plant, called the *Embryo*. Let pupils distinguish the parts, while giving name and function of each,

2. Next pass round class grains of wheat or barley. Tell them to open them and see if they can distinguish two cotyledons. Show that all seeds are not alike. Some have only *one*, others *two*, and a few have more, *e.g.*, *pine*. This gives rise to two great classes of plants, which derive their name from having one or two cotyledons. Elicit names *mono-* and *di-*cotyledon by analogy with one tone (*mono-tone*) in music, Greek *monos*, and *dialogue* (discourse between two). Now examine the grain of wheat minutely. Call attention to only one cotyledon, greater part of grain consisting of soft, mealy substance called *albumen*. Ask its use (1) to the seed, (2) to man. We shall now find a great difference between the *dicotyledons* of the *bean* or acorn and the *sycamore*. Draw from class, after their examination of both, that the former has thick, fleshy cotyledons, while the latter has only thin, leafy ones. Ask if they ever noticed an acorn germinating, and what happens to the cotyledons during the process, likewise those of the *sycamore*. Draw diagrams to show how the former remains underground supplying the young plant with food; the latter rise above ground carrying spermoderm, which is carried off by the wind.

III. <i>Assimilation.</i>	} As in matter.
IV. <i>Recapitulation.</i>	

V. During the last few minutes ask what lessons we may learn from studying the seed, and elicit those in matter or other suggested by class.

NOTES OF AN OBJECT-LESSON ON THE FLOWER.

Class—Age, 9 to 11 years. *Time*—Half an hour. *Aim*—To give class an interest in flowers and to teach them the parts.

MATTER.

I. Preparation.

Supply each member of the class with a common flower for examination.

II. Presentation.

1. Parts of a flower.
 - (a) Stalk called in botanical language *peduncle*.
 - (b) Calyx composed of *sepals*, two, four or five; generally green, sometimes coloured as in the fuchsia.
 - (c) Corolla composed of *petals*, brightly coloured.
 - (d) Stamens composed of two {
 - i. Filament.
 - ii. Anther, containing pollen.
 - (e) Pistil, of which the chief part is the ovary or seed-box, containing the ovules or future seeds.
 - (f) The two outer whorls are protective organs, non-essential; the two inner, essential organs.
2. Perfect and complete flowers.
 - { Flowers which possess all four whorls are called complete. Those which possess the two inner, with or without the outer, are called perfect.
3. Function of the different parts.
 - { Sepals to protect the bud from cold, etc.
- Corolla.
 - {
 1. The bright-coloured petals attract bees, which gather honey secreted in the flower.
 2. They charm the eye and give pleasure to man.
- Stamens.
 - { The anther contains the pollen, whose office it is to fertilise the ovules or young seeds.
- Pistil.
 - { The ovary contains the ovules, which are ripened by the pollen, and whose office it is to reproduce the plant.

III. Recapitulation.

Question on the above.

IV. Application.

Give class a second flower, which they are to examine for themselves and be able to describe verbally at beginning of next lesson ; or each pupil might with profit *choose* their own flower.

PROCEDURE.

I. Introduce lesson by distributing a flower (some well-known one by preference) to every pupil.

II. Tell class to examine carefully, and mention what different parts they notice. Give botanical name for stalk. Give them name calyx ; *cf.* chalice—a cup. Note in French the same word for both—*calice*. Tell them to think of other flowers, and ask them the usual colour of the calyx (green). Let them think, if they can, of some flowers that have coloured calices ; if not, tell them the fuchsia. Tell them to count the number of divisions, and give them the term sepals. The next whorl, the corolla. Let class count the number of divisions, and give the name (petals). Note that they are generally bright coloured. Let them name some flowers that they know, and say what colour the corolla is. Let them say what they notice in the interior of the flower. Ask them how many parts these stamens have. Give terms filament and anther. Ask them if there is anything inside the anther. Give term pollen. Remind them of the large white lilies in which it is so abundant. Tell them it is not always yellow, sometimes black, *e.g.*, poppy, sometimes blue, mullein, sometimes red, Turk's cap lily. The innermost whorl is the pistil, of which the chief part is the ovary or seed vessel. Let class say what is the office of the outer whorls. Give the terms essential and non-essential. Let class say what a flower is called which possesses all four whorls. Then tell them a flower which possesses the two inner is called perfect. Note how incomplete flowers may be perfect, but imperfect cannot be complete. Let class say the use of the calyx. Tell them how some calices drop off as soon as the flower opens, *e.g.*, poppy. Ask what part the corolla plays. What is it that makes the flower so pleasing ?

Let class say what is found in the heart of the flower. How are the bees attracted to it? Tell the incident of Linnæus and the gorse field. Ask class if they have ever known people to pull off anthers of plants which they want to keep some time. If not, tell them that this is to prevent the seeds ripening. Tell how the pollen lights on the stigma and passes down the style till it reaches the ovary where it enters and fertilises the ovules, which, when ripe, are called seeds. Let them say, if they know, what happens to the ovary when the seeds are ripe. Examples: primrose, poppy, violet and pansy.

Last whorl is the pistil, of which the chief part is the ovary, which contains the future seeds, therefore the duty of the stamens and pistil is to reproduce the plant. Question on the above.

III. Name the four whorls of a flower. What are the divisions of the calyx called? The corolla? What are the stamens? Pollen? Ovary? What is a perfect flower? A complete flower? Which are the essential organs? What is the office of the corolla? The pollen? The ovary?

OBJECT-LESSON ON AN APPLE.

Class—Form I.; age, 9 to 11 years. *Time*—Half an hour. *Aim*—To exercise the powers of observation.

MATTER.

I. Preparation.

Show an apple and ask what class know about it.

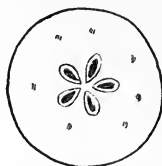
II. Presentation.

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| 1. <i>Qualities.</i> | { | (a) Round.
(b) Smooth.
(c) Eatable.
(d) Green and rosy colour. |
|----------------------|---|---|

2. *Parts.* { (a) Skin (inseparable).
 (b) Pulp (soft, juicy).
 (c) Core (five horny cells) containing
 (d) Pips (seeds of the plant).



APPLE.



CROSS SECTION OF APPLE.

3. *History.*

The central part of the apple blossom much increased in size after the flower has faded. The pollen or yellow dust of the flower fertilises the ovary or seed-box, making it into the core.



APPLE BLOSSOM.



APPLE BLOSSOM WITH ENLARGED THALAMUS.

PROCEDURE.**III. Association.**

1. Compare and contrast with other fruits as to:—

- (a) *Shape.* Pear, plum, peach.
- (b) Orange and peach.
- (c) Potato, service berries, rose-fruit (hips).
- (d) Grape, gooseberry, pear, greengage, etc.

2. Compare and contrast with orange, separable thick skin. Like pear, unlike gooseberry, grape and greengage.

Contrast cross section of peach and grape with apple.

3. Show rose-hips and compare history.
Contrast potato.

IV. Recapitulation.

In what does an apple resemble a pear, and how do they differ? What part is most useful? Which is the most important for the plant? Compare it with the parts of a peach or an orange.

V. Application.

Let class draw the two illustrations of an apple and write out what they know about each.

OBJECT-LESSON ON SUGAR.

Class, Preparatory. Time—Half an hour. *Aim*—To exercise the powers of observation.

MATTER.

I. Preparation.

Give round some soft white sugar. Let class examine without tasting it. Deduce that it might be either salt or sugar from appearance. Let them taste it to decide.

II. Presentation.

1. *Qualities.*
- (a) White (sometimes brown).
 - (b) Small grains or crystals.
 - (c) Sweet to taste.
 - (d) Soluble.
 - (e) Melts with great heat (fusible).
 - (f) Burns (combustible).



SUGAR-CANE.

2. *Kinds.*
- { Soft brown (common).
 - { Soft white (refined).
 - { Loaf, white (baked hard).

3. *Formation* : (a) It is the pith or soft central part of the stem of (1) *Sugar-cane* (describe the long reed); (2) *Maple tree*; or (3) from the *root* of the *beet* (description to be elicited).

(b) Canes cut in lengths; pressed between heavy rollers; juice refined by various processes; beet-root ground and juice expressed.

PROCEDURE.

III. Association.

Contrast with other substances as to qualities, *e.g.*, *appearance*, salt; *soluble*, mud, sand, etc.; *fusible*, glue, gum, glass; *combustible*, *cf.* wood, contrast stone.

<i>Uses.</i>	1. Sweetening food.
	2. Preserving fruits, meats, etc.
	3. Unripe cane as fodder for cattle.
	4. Rum extracted from the molasses; also treacle.

Where obtained. Dwell in this lesson chiefly on the sugar-cane, grown largely in India and West Indies.

Description. Show sketch of plant, *cf.* pampas grass. Describe sugar plantation, canes sown horizontally. Why? How gathered? (*Cf.* cotton.) Describe the process of extracting the sugar—crushed. Boiled in lime water. Why? Cooled in pans, placed in wooden perforated boxes (drain off molasses). Further purified, dissolved, poured into conical moulds. Three parts: *base*, white; *middle*, yellow; *top*, brown.

V. Recapitulation.

Question on the qualities in connection with its uses. Ask class to contrast salt and sugar as to uses, qualities and history.

OBJECT-LESSON ON CORK.

Class—Average age, 12. *Time*—Half an hour. *Aim*—To exercise the pupils' power of observation in eliciting the qualities and uses of cork.

MATTER.

I. Preparation.

1. Give round specimens to class and allow time to examine them.

2. State what lesson is to be about, and ask questions as to what things they have seen made of cork.

II. Presentation.

1. *Qualities* (to be elicited). {
- (a) Light brown.
 - (b) Soft.
 - (c) Light.
 - (d) Elastic.
 - (e) Floats in water.
 - (f) (Dry) waterproof.

III. Application.

2. *Uses deduced from qualities.* {
- (a) Lifebelts and lifeboats.
 - (b) Stopping bottles.
 - (c) Socks for shoes.
 - (d) Cork helmets (lined).
3. Cork is the bark of a tree (show virgin bark and picture of cork tree—kind of oak).
4. *Where grown.* {
- (a) Spain, Italy, South France.
 - (b) Takes place of oak in forests.
 - (c) Bark stripped when fifteen years old.
 - (d) Every seven years for ten or twelve times.
 - (e) Method of cutting.
5. *Prepared.* {
- Soaked in water.
 - Flattened with weights.
 - Exported in bales.

PROCEDURE.

I. Specimens given to pupils. Question as to what they are. Where they have seen them before, etc. We are going to find out all we can about cork. Who has seen anything made of cork? How do we see it used oftenest? etc.

II. Tell the class to examine pieces well; first without touching, and from use of sight elicit colour. Then allow class to touch specimens, and ask what has been discovered by three or four of them. Elicit soft. Then compare with stone, metal, wood, etc., and give pieces to feel for comparison.

Let a piece of stone, metal and cork all drop into a jar of water, and from result seen by class elicit that the cork floats. What happened to the stone? The metal? The cork? Why did the stone sink? Why did the cork *not* sink? What then does cork do in water? So if I have a piece of cork in one hand and a stone in the other, which will be the heavier? So what other quality can we give cork? Here take the piece that has been in the water and cut it, and let the class see the cross section, and deduce that it is dry, therefore the water did not soak through the cork. What would have been the case with a piece of wood? From use of waterproof as name of garment, elicit the word waterproof as a quality of cork. Now, tell me why we use corks to stop bottles and not pieces of wood? There is still another reason. Refer to cork being larger when out of bottle than in (champagne bottles). How does cork fit in if it is larger? Compare wood or stone, if larger would never squeeze in, and elicit the soft and yielding nature of cork. Cf. indiarubber and elastic: hence name of quality elastic. Now give me two reasons why cork is useful to stop bottles. What two qualities make it useful in this way? What did we notice when cork was dropped into water? When do people want very much to be kept afloat in the sea? For instance, refer to wreck, and elicit, if possible, lifebelts used. Why not made of metal, stone, or even wood? Why cork? What quality of cork makes it useful in this way? Lifeboats also lined with it. What did we find when we cut the cork that had been in the water some time? What quality did this experiment prove it to have? Now when we go out in the wet, what is it we try to keep from the damp? Why do we put on heavier shoes? Now we found that cork does not let the water pass through it. How does it come in useful in this case? What quality caused the cork to float in water? This is useful in making things that we wish to be light; so inside of men's hats we sometimes find cork—helmets worn in India and hot countries.

III. *Recapitulation*: What qualities have we discovered about cork? Name three. What are the other qualities? How did we find out that cork was light, soft, waterproof, elastic? What quality of cork makes it useful as bottle stoppers, as lifebelts, as soles of shoes, lining of helmets?

(Here show specimen of cork as bark.) Ask the class what it looks like. What part of a tree? Tell that cork is the bark of a tree, but not of any tree in this country. The cork tree grows in Spain, and the bark is stripped off every seven years, and this is the material from which we obtain corks, soles, lifebelts, etc.; sometimes used for ornament in conservatories, etc.

FIRST LESSON ON FORM (ELEMENTARY EUCLID).

Class—Form I.; age, 9 to 10 years. *Time*—Half an hour. *Aim*—To exercise judgment and discrimination in discovering the essential properties of figures taught.

MATTER.

I. Preparation.

1. "A line is length without breadth."
2. "A straight line is the shortest distance between two points."

II. Presentation.

Figures contained by straight lines.

1. Two straight lines cannot enclose a space.
 - (a) *A triangle* is a figure contained by three lines.
 - (b) *A quadrilateral*, a figure contained by four lines.
 - i. *A square* has four equal sides and four equal angles.
 - ii. *A rhombus* has four equal sides and opposite angles equal.
 - iii. *A rectangle* has four unequal sides and four equal angles.
 - iv. *A rhomboid* has opposite sides equal and opposite angles equal.

III. Recapitulation.

What is a line? What is a straight line? Why is a line said to be straight? Can I make a figure with two straight lines? What is a triangle? A quadrilateral? What is a square? A rectangle? What is the difference between a rhombus and a square? A rhomboid? What is the difference between a square and a rectangle? What name do we give to all these figures?

IV. Application.

Make pupils look round class-room and determine and name the *form* of things like *maps, windows, blackboard, a book, panes of glass in windows*, etc.

Lead them to find instances of the true line, *e.g.*, between two bands of colour, or two liquids (of varying density) in same glass, etc.

PROCEDURE.

I. Draw lines of different lengths on blackboard, and ask pupils how they would measure such lines. Then draw a shaded rectangle, and ask how they would measure it. Deduce in one case only length, in other length and breadth. Give examples of measurement of a room or a wall. Show by illustration the line between two bands of colour. So when we speak of a line, what must we take into account only? What may we say a line is then?

II. Draw several lines on blackboard, and ask them to point out which are straight and which not. (Clear up idea of straight not necessary in vertical position, by showing that a ruler is straight no matter how it is placed or held.) Then from two points draw a straight line and a curved line, and draw from class which is shortest distance. Give familiar examples, always coming back to point that a straight line is shortest distance between two points. Refer again to ruler and show that it is straight for the same reason. Repeat definition together.

Now that we know what a straight line is, we shall see what figures we can make with these lines. Draw from

class that no figure can be enclosed by two straight lines. What is the least number of straight lines which can be used to form a figure and enclose a space? Give example of wall round a garden, field, etc., to illustrate meaning.

III. (a) Make a pupil come forward and draw a figure with three straight lines. Ask what such is called. *Triangle* (write on blackboard). Now let us examine these figures (after drawing several irregular triangles). What have they all got the same? And something else? Three corners. Now the grand name for corner is *angle*, the corner made by two lines meeting one another at a point. Now what can we say a triangle is? (Here question till full definition is given.)

(b) Now we shall make a figure with four sides (make an irregular quadrilateral). This we call a four-sided figure, or, in a grand word, *quadrilateral* (write on blackboard). How many sides have these figures? Four sides and four angles. Make several on blackboard, including rectangle and square. Now could we call any of these figures by another name? *Square*. Now we shall examine this figure. How many sides has it? How many angles? What do we notice about sides? About the angles? So when we speak of a square, what sort of a figure do we mean? How many things are necessary in the figure to make it a square? Now what is definition of a square from the above (push square sideways to make rhombus). Draw from class difference between this figure and square. What do we notice about sides? About angles? What is therefore chief difference between this figure and square? Now what is a rhombus then? What is a square? Then draw a quadrilateral in same way. Deduce that it is a four-sided figure, but differs from square in that four sides are not equal. Same way for a rhomboid. Then draw the four figures on blackboard, and name beside each, and ask definition of each.

NOTES OF A LESSON ON THE METHOD OF PASSING A BILL IN PARLIAMENT.

Class—Age, 13 to 15 years. *Time*—Three-quarters of an hour.
Previous Knowledge—Growth and development of Parliament. *Aim*—
 To lead the class to understand the value of a representative Government and interest them in the workings of “the House”.

MATTER.

I. Preparation.

1. Refer to origin and development of Parliament.
2. Origin of Bill.

{	<ol style="list-style-type: none"> (a) Right to share in framing laws. (Edward II., 1307.) (b) 1309. Petitions added to Bills as condition of supplies. (c) <i>Bill</i> substituted for <i>Petition</i>—difference of Bills and Petitions.
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II. Presentation.

1. *Two Kinds.*

{	<p><i>Public</i> : Laws, supplies, taxation, etc.</p> <p><i>Private</i> : Not affecting public good.</p>
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Note.—May originate in either “House,” but supplies and taxes in Commons only. (Henry IV.)

2. *How passed.*

- | | | | | | | | | | |
|----------------------------|--|--|---------------------|--|---|--|--|---|--|
| (a) <i>First Reading.</i> | { | <ol style="list-style-type: none"> i. Never opposed. ii. Spaces left for amendment. iii. Time given to get printed for information of M.P.’s. iv. Passed by division, “aye” or “no”. | | | | | | | |
| (b) <i>Second Reading.</i> | { | <table style="border: none;"> <tr> <td style="vertical-align: middle;">i. Opposition made.</td> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="vertical-align: middle;"> <ol style="list-style-type: none"> (a) <i>Select</i>, consisting of fifteen members, or <table style="border: none; margin-left: 20px;"> <tr> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="vertical-align: middle;"> <ol style="list-style-type: none"> i. Great latitude in debate. </td> </tr> </table> (b) <i>Whole House.</i> <table style="border: none; margin-left: 20px;"> <tr> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="vertical-align: middle;"> <ol style="list-style-type: none"> ii. <i>Motions</i> need not be seconded. iii. Unlimited speech. </td> </tr> </table> </td> </tr> </table> | i. Opposition made. | { | <ol style="list-style-type: none"> (a) <i>Select</i>, consisting of fifteen members, or <table style="border: none; margin-left: 20px;"> <tr> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="vertical-align: middle;"> <ol style="list-style-type: none"> i. Great latitude in debate. </td> </tr> </table> (b) <i>Whole House.</i> <table style="border: none; margin-left: 20px;"> <tr> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="vertical-align: middle;"> <ol style="list-style-type: none"> ii. <i>Motions</i> need not be seconded. iii. Unlimited speech. </td> </tr> </table> | { | <ol style="list-style-type: none"> i. Great latitude in debate. | { | <ol style="list-style-type: none"> ii. <i>Motions</i> need not be seconded. iii. Unlimited speech. |
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| { | <ol style="list-style-type: none"> i. Great latitude in debate. | | | | | | | | |
| { | <ol style="list-style-type: none"> ii. <i>Motions</i> need not be seconded. iii. Unlimited speech. | | | | | | | | |

(c) *Third Reading*: Passed by division.

Similar method through *House of Lords*:—

1. Three Lords make a “House”.

2. “Content” and “Non-content”.

(d) *Signature of Sovereign*, and Bill becomes law.

III. Association.

Contrast use of Parliament made by the Tudor Sovereigns, especially Henry VIII. and Elizabeth, also Stuarts.

IV. Recapitulation.

Chief points to be recalled by questions, and a scheme with these to be written on blackboard by the teacher.

V. Application.

Apply knowledge to the work of Parliament in past years: Bills referring to war, supplies, taxation; others, such as Educational Bill, etc.

PROCEDURE.

I. Introduce lesson by questions on Parliament, its origin, history, and first work having to do with supplies only. In whose reign were petitions added as conditions of supply, and why? When did Parliament get the right of framing laws? Name some Act passed in reign of Edward II. Here refer to Petitions substituted by Bills, and point out chief difference. When a law has to be made now who has to do it? It is presented to the Parliament in the form of a Bill.

II. These Bills are of two kinds, public and private. Name some Acts passed in history which concerned the public. (Catholic Emancipation, Disestablishment of Irish Church, Gladstone's Home Rule Bill, etc.) A private Bill, as the name implies, has to do with private affairs, companies, constructions, etc. All these Bills may originate either in the Lords or Commons, except one kind of Bill. What regulations as to Parliament were made in the reign of Henry IV.? Since that time where must Bills having to do with money or supplies originate? Bills having to do with taxation, who are most affected by them? The people. Why then is it more just that such Bills should originate in

the Commons rather than the Lords? Suppose a Bill regarding taxation (refer to those for Transvaal War) is to be brought into the House. Explain that it must go through three readings before becoming law. First reading: No opposition, to give chance of amendment, time to be printed. *Division*: Explain method, as an eye-witness. Show picture of House of Commons. "The Ayes have it," or "The Noes have it". Second reading followed by opposition. Why? Here the politics of different parties in the House are seen. Difficult stage to get through. Why? Division as before, and then the separate clauses of the Bill are discussed in Committee (meaning of word). *Select* for private Bills. *Whole House* for public Bills. Privileges lead to 1, 2 and 3, and result is sometimes made use of for political purposes (Irish members in 1877 and 1887). Explain separately meaning of each of the privileges of the committee. When changes have been made and all finally discussed, then the Bill is reported with amendment. Who are represented by all these members in committee? When the Bill has passed who really has brought it through? What sort of government do we call this, and why?

The third reading is the final stage, and the exciting part for the nation if the question is a momentous one (*e.g.*, Catholic Emancipation, 1829, and Home Rule, 1886, lost by small majority). Same method of passing occurs in House of Lords; can be thrown out by Lords. Forty members make a "House" in Commons, and three in Lords. Method of division different, "content" and "non-content". Signature of Sovereign makes Bill law by Act of Parliament. No Sovereign has refused since Anne, 1707. What did she refuse? Why not advisable for Sovereign to refuse? Whose power is limited by this sort of government?

III. Contrast use of Parliament made by the Tudor Sovereigns, especially Henry VIII. and Elizabeth.

IV. How many kinds of Bills may be brought into Parliament? What is a private Bill? A public Bill? What is necessary to make a Bill law? What happens at the first reading? Second? Third? What does it mean when

“House goes into committee”? How does it pass House of Lords? When does it become law?

V. Question on present work of Parliament so as to lead pupils to understand present stages of different Bills which are under discussion.

NOTES OF A LESSON ON THE INVENTION OF PRINTING.

Class—Age, 14 to 16 years. *Time*—Three-quarters of an hour. *Aim*—To exercise the imagination and judgment of the class by the history and results of this invention.

MATTER.

I. Preparation.

<i>Earliest forms.</i>	Where found.	1. Egypt.	(a) Bricks, stone, pyramids and obelisks.
			(b) Plaster, clay, woodcuts.
			(c) Bark of trees. { <i>E.g.</i> , signet ring.
		2. Greece and Rome.	(d) Papyrus. {
			(a) Wax tablets.
			(b) Stamped characters.
		3. China.	Tenth century, printed from wooden blocks.
			No movable type.

II. Presentation.

<i>Invention. Fifteenth Century.</i>	Germany.	Gutenberg (movable type).
		Fust (pecuniary aid).
		Three towns { Strasburg. claim its { Maintz. invention. { Haarlem.
	Holland.	Bruges. Colard Mansion, 1435.
	England.	{ Caxton, 1474. “Game and Play of Chesse.”

III. Association.*

<i>Effects on Period.</i>	1. Church.	(a)	Took livelihood of monks.
		(b)	Helped to spread doctrines of Reformation.
		(c)	Religious works the first printed.
	2. Literature.	(a)	Chronicles and history of countries.
		(b)	Poetry and prose of nations preserved.
	3. Education.	(a)	Increased number of books and therefore of scholars.
		(b)	Helped the revival of letters.
		(c)	Preserved the Greek classics.
		(d)	Reading became more common.

IV. Application.

<i>Uses.</i>	1.	Preservation of good literature and art.
	2.	Influence exercised by press to good or evil.
	3.	Advancement of learning.
	4.	Intercourse between nations.
	5.	Spread of ancient and modern languages.

V. Recapitulation

Of	1.	Origin and invention.
	2.	Effects and uses.

PROCEDURE.

I. Introduce lesson by questions on the earliest forms of books. How made. Refer to other remains of writing or carving on stone and wood. What formerly was used

instead of paper? What sort of remains do we find in Egypt? (*cf.* Cleopatra's Needle). Give example of stamp of a signet ring. In Greece and Rome how was writing done? With sticks on wax tablets. Refer to use of reversed stamped characters, which we use now for marking names on notepaper, etc. Tell the class of near approach to printing in China in tenth century, but the difficulty on account of new blocks being required for every page. What change was wanted to make their printing easier? (Explain matter of type.)

II. Show how all the early forms led up to the invention. State date and give history of Gutenberg and Fust (or Faust). Refer to origin of idea by seeing the mark of a horse's hoof in the sand. Show three towns on map, and explain why each claims right of *invention*. Show how Holland learnt from Germany and England from Holland. Tell the story of Caxton and his press at Westminster, his life at Bruges, and the result of his efforts. Question on period at which he lived. Why was printing important then?

III. Taking into consideration the period of invention, what effect would it have on the Church? Who produced books formerly? (Describe scriptorium and refer to copies extant.) What religious movement occurred about this time? How would this be effected? What effect for good would printing have on the Church?

How do we know the account of our history? Even this invention itself? How then did printing affect literature? Give and ask examples of literature that have been preserved from these times.

Why should printing affect education? What was the result of the increase in number of books? Refer to Renaissance and Greek Classics. How affected by this invention? Increase of readers: hence reading taught. Compare present generality of readers in a nation with times before printing. What has caused the change?

IV. What would we lose without printing? Draw from class uses at present day—for good, for evil. The

effect of reading on nation's character. Where do we get matter for reading? Literature, science, newspapers, studies, etc. Refer to preservation of art by printing pictures. Intercourse between nations. How exercised? How does printing increase it? Learning of foreign languages. How helped? Refer to difficulties of missionaries in learning languages when there is no written record or literature.

V. *Recapitulation*: Give some examples of earliest forms of printing in China, Egypt and Rome. What was printing of China in tenth century? Give an account of invention. How did it reach England? What effects on Church? Education? Literature? Give some of its uses at present day—for good, for evil.

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